QC.93 W3 WRC

REFERENCE

VOLUME 72 [W. B. No. 1419] NUMBER 9

UNITED STATES DEPARTMENT OF COMMERCE
JESSE H. JONES, *Secretary*
WEATHER BUREAU - - F. W. Reichelderfer, *Chief*

MONTHLY WEATHER REVIEW

SEPTEMBER 1944

CONTENTS

	Page
THE NORTH ATLANTIC HURRICANE OF SEPTEMBER 6–13, 1944. (4 figs. and 2 lithographs) H. C. SUMNER	187
METEOROLOGICAL AND CLIMATOLOGICAL DATA:	
Aerological Observations	190
River Stages, and Floods	195
Climatological Data	197
SOLAR RADIATION AND SUNSPOT DATA:	
Solar Radiation Observations	202
Positions, Areas, and Counts of Sunspots	204
CHARTS I–XI (CHART VII, SNOWFALL, OMITTED UNTIL NOVEMBER).	

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - - See page 4 of cover for prices

MONTHLY WEATHER REVIEW

Editor, EDGAR W. WOOLARD

VOL. 72, No. 9
W. B. No. 1419

SEPTEMBER 1944

CLOSED NOVEMBER 5, 1944
ISSUED DECEMBER 5, 1944

THE NORTH ATLANTIC HURRICANE OF SEPTEMBER 8–16, 1944

By H. C. SUMNER

[Weather Bureau, Washington, D. C.]

DURING September 14 and the morning of the 15th an intense hurricane, similar in many respects to the destructive storm of 1938, lashed 900 miles of the east coast of the United States from Hatteras northward. The tracks of these two storms are reproduced in chart I. As they occurred in an interval of less than 6 years, and were the first intense tropical storms to reach the New England area in over 50 years, they will probably come to be known as the First and Second New England Hurricanes. Earlier storms, apparently of tropical origin, have ravaged the same section, and a listing of these storms is given later in this report. Tracks for those of 1815 and 1821, which by coincidence also occurred within a period of 6 years, are traced in chart II.*

The hurricane of September 17–21, 1938, is recognized not only as the most destructive storm to reach the coasts of this country but also, from the standpoint of damage inflicted, as one of the two greatest disasters in the history of the continent. Reliable estimates have placed property damage in the San Francisco Earthquake and in the Hurricane of 1938 at about the same figure—$350,000,000.

Several hurricanes have resulted in a greater number of fatalities, notably: The South Atlantic Coast storm of late August 1893, with a loss of about 2,000 lives; the Louisiana-Mississippi hurricane of early October 1893, with an estimated 1,800 fatalities; the Palm Beach hurricane of September 1928, which resulted in 1,836 deaths; and the Galveston hurricane and tidal wave, September 8, 1900, which took a toll of about 6,000 lives.

Although the hurricane of 1944 was probably of as great intensity as that of 1938 while it swept over the Atlantic east of Florida, several circumstances combined to militate against the heavy casualties and property damage that occurred in the 1938 storm. First among them was a gradual filling of the depression, and a resultant drop in wind velocity after the center passed Hatteras. This decrease in the pressure gradient, coupled with a slower progressive movement than accompanied the earlier storm, brought the center to the heavily populated coastal regions of New England in a less vigorous form than was evidenced in the hurricane of 1938.

*Track of the 1815 hurricane constructed by Tannehill, from newspaper clippings collected and abstracted by Noyes Darling and published in The American Journal of Science and Arts, Vol. XLII, pp. 243–252 New Haven 1842. Track of the 1821 hurricane, according to Redfield.

HISTORY OF THE HURRICANE

The existence of the 1944 hurricane was first suspected on the 8th of September when a pressure fall, accompanied by erratic winds, was noted moving into the Windward Islands. This disturbed condition later showed a circulation pattern. At 4 p. m. (E. W. T.) on the 8th, the presence of a tropical disturbance was announced in a preliminary advisory radioed from San Juan, P. R.

Since this light circulation did not account for other indications that a strong disturbance existed in the vicinity, a reconnaissance plane was dispatched on the 9th to search for a storm farther north. This flight located an intense storm in the vicinity of latitude 21° N., longitude 60° W., and later reconnaissance proved it to be a fully developed hurricane moving in a west-northwesterly direction.

From this point to the northeast of the Leeward Islands the hurricane drifted west-northwestward, in the prevailing air stream, until further reconnaissance located the center off the northern Bahama Islands near latitude 27° N., longitude 74° W. on the evening of the 12th. At this stage of its progress the hurricane was so large and violent that the term "Great Atlantic Hurricane" was adopted in advisory messages from Miami in order to convey a proper description.

A weather officer aboard an army reconnaissance plane which became involved in the storm estimated the wind at about 140 miles per hour. He reported turbulence so great that with the pilot and copilot both at the controls the plane could not be kept under control, and several times it was feared it would be torn apart or crash out of control. When they returned to base it was found that 150 rivets had been sheared off on one wing alone.

At about 9 p. m. of the 12th, the storm was centered near the 75th meridian and the expected recurve to the northward became apparent. Moving almost due north, at a rate of 25–30 miles per hour, the center passed just east of Hatteras at about 9:20 a. m. (E. W. T.) on the 14th. Then turning slightly to the northeastward it moved up the coast, at an accelerated speed of about 40 miles per hour, and crossed over eastern Long Island at about 10 p. m. of the same date. Moving inland about an hour later near Point Judith, R. I., the center crossed

615942—44——1

the States of Rhode Island and Massachusetts, passing a short distance southeast of Boston, and moved into Massachusetts Bay shortly after 1 a. m.

The center again passed inland, on the Maine coast, and later crossed southeastern New Brunswick near the head of the Bay of Fundy. Late on the 15th it passed over Newfoundland and finally merged with an extra-tropical cyclone southeast of Greenland.

PRESSURE

The lowest pressure so far reported for the 1944 hurricane is 947.2 millibars (27.97 inches) recorded at Hatteras, N. C., about 8:20 a. m. of the 14th. The reading is only 0.12 of an inch higher than the low pressure of 943.1 millibars (27.85 inches) observed aboard the S. S. *Carinthia* during the hurricane of 1938. It is quite possible that, when readings of barometric pressure become available from ships heavily involved in the recent storm, even lower readings than those above will be reported.

The lowest sea-level pressure on record is a reading of 26.185 inches taken on August 18, 1927, aboard the Dutch steamship *Sapoeroea*, while she was involved in a Pacific typhoon 460 miles of the Island of Luzon in the Philippines. The lowest sea-level pressure on record in the Western Hemisphere is 26.35 inches, recorded in the Florida Keys storm of September 2, 1935.

WINDS

The highest wind velocity recorded by instrument was an extreme velocity of 134 miles per hour, observed at approximately 12:20 p. m. on September 14, at Cape Henry, Va. Maximum wind velocities equaled or exceeded all previous records at Hatteras, Cape Henry, Atlantic City, New York, and Block Island.

Stations in table 1, a summary of meteorological conditions accompanying the 1944 hurricane, are arranged in a time sequence corresponding, as nearly as possible, to the order in which they were affected by the storm.

TIDES AND INUNDATION

Fortunately, and in contrast to the hurricane of 1938, the recent storm struck inland over Connecticut, Rhode Island, and southeastern Massachusetts at a time of normally low tide. In addition the latest storm struck the coast obliquely, with coastal points on the left or weaker side of the center. As a result the great storm tide which is created by the stronger winds in the righthand quadrants, expended most of its force at sea. No tide heights were recorded in the recent storm which even remotely approach the 20- to 25-foot levels registered in 1938.

LOSS OF LIFE AND PROPERTY DAMAGE

A total of 390 lives were lost as a result of the 1944 hurricane, a large proportion of them as a result of marine casualties. The 46 deaths listed as occurring along the coastal areas of the United States is less than 10 percent of the 494 fatalities resulting from the storm of 1938. Heavy marine casualties were directly related to intensified patrol work and other exigencies resulting from war conditions. Property damage has been estimated at approximately $100,000,000 or about one-third that estimated for the 1938 hurricane.

A survey of the hurricanes of the past 50 years shows that a constantly-improving hurricane warning service has brought about a progressive reduction in the number of deaths per unit of hurricane damage. A tabular breakdown of casualties and damage, by States, is included in table 4.

WARNINGS AND ADVISORIES

A total of 51 warnings and advisories were issued by the Hurricane Warning Centers at San Juan, Miami, Washington, and Boston. Prompt dissemination of these warnings by news distributing agencies resulted in the evacuation of thousands of persons in threatened areas, and the safeguarding from storm damage, insofar as was possible, of protectable property. In New York City, during the period of storm inquiries from September 12 to 15 inclusive, a total of 289,486 calls were received over the automatic telephone system.

HISTORICAL STORMS OF NEW ENGLAND

Below are descriptions of three of the most severe New England hurricanes. Other storms, probably all of tropical origin, which seriously affected the New England States occurred on August 19, 1788; September 8, 1869; October 23–24, 1878; and August 24, 1893.

August 15, 1635. Probably the earliest tropical storm on record in New England began shortly after midnight with heavy rain and a wind that had shifted from south-southwest to northeast. Later the wind increased in violence and was accompanied by torrential rain. After the gale had continued 5 or 6 hours, the wind changed to northwest and gradually subsided. During that month a hurricane, possibly the same storm in an earlier stage, occurred between Martinique and St. Kitts.

September 22–23, 1815. The "Great September Gale" of 1815 was one of the most destructive hurricanes to reach New England. Heaviest damage occurred in Rhode Island and central Massachusetts. On the coast of Connecticut high tides and hurricane winds destroyed many buildings and numerous vessels were driven ashore. The storm began on September 22 and reached its height shortly before noon on the following day. This storm, which had moved up from the West Indies, had been recorded at St. Bartholomew on the 18th. A survey of the damage caused by this hurricane convinced W. C. Redfield that the storm was a "progressive whirlwind," and as a result he began his study of cyclonology.

September 3, 1821. The center of this destructive hurricane crossed the western part of Long Island and passed northward into Connecticut.

Complete accounts of most of these early New England storms can be found in "Historic Storms of New England" by Sidney Perley, The Salem Press, 1891.

ACKNOWLEDGMENTS

The Weather Bureau wishes to express its sincere appreciation to the many organizations and agencies which performed essential roles in vitalizing the Hurricane Warning Service.

To the Army Air Forces newly organized Weather Unit goes credit for the early detection of the storm, and for securing fixes on the center, direction of movement, and wind intensities, at a time when the hurricane was still some distance east of Antigua in the West Indies, and 5 days before signs indicative of such a circulation could have been picked up on the Atlantic coast. With the absence of radio weather reports from ships, this aircraft reconnaissance service, which is employed by the Army, Navy, and Coast Guard, was the only source of early observational data.

Equally appreciated is the unqualified support given by all news distributing agencies who, through their vast facilities, were charged with getting the warnings to the public. Personnel of the newspapers and the radio networks bent every effort toward the fulfilment of this trust.

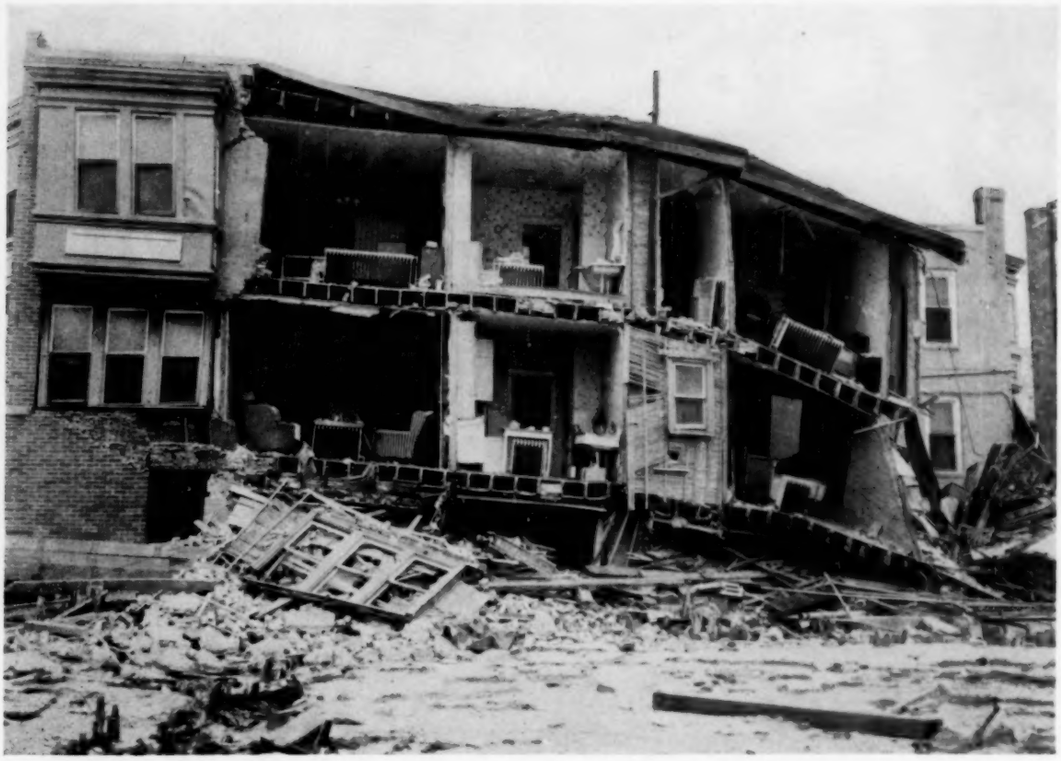


FIGURE 1.—Wall torn from building on Seaside Avenue, Atlantic City.

FIGURE 2.—Debris and structural damage near the Boardwalk, Atlantic City.

FIGURE 3.—Paving completely undermined on Seaside Avenue, Atlantic City.

FIGURE 4.—Heinz Ocean Pier, Atlantic City, after the hurricane.

Chart I. Tracks of the Destructive September Hurricanes of September 1938 and 1944.

Chart I. Tracks of the Destructive September Hurricanes of September 1938 and 1944.

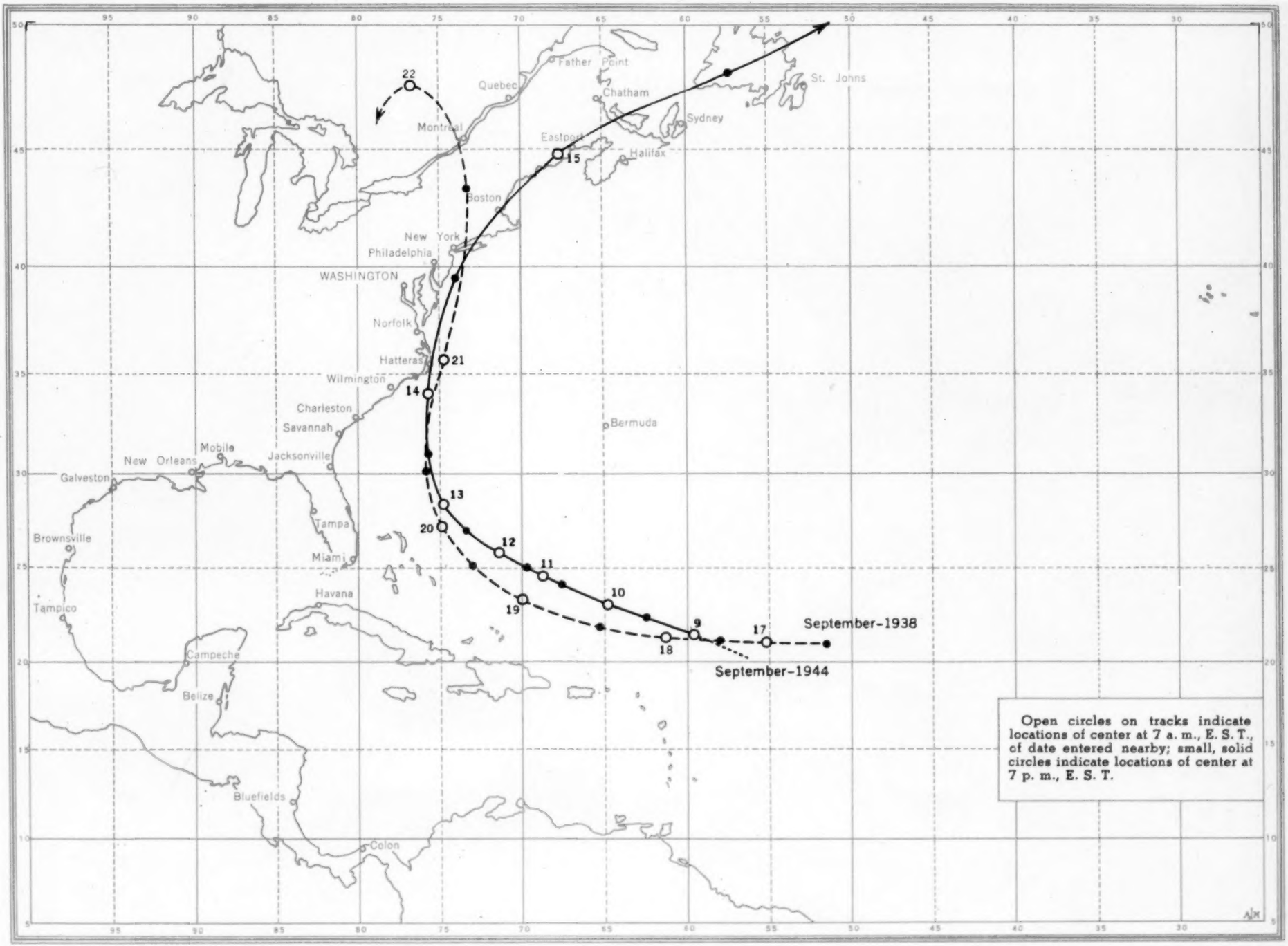


Chart II. Tracks of the September Hurricanes of 1815 and 1821.

Chart II. Tracks of the September Hurricanes of 1815 and 1821.

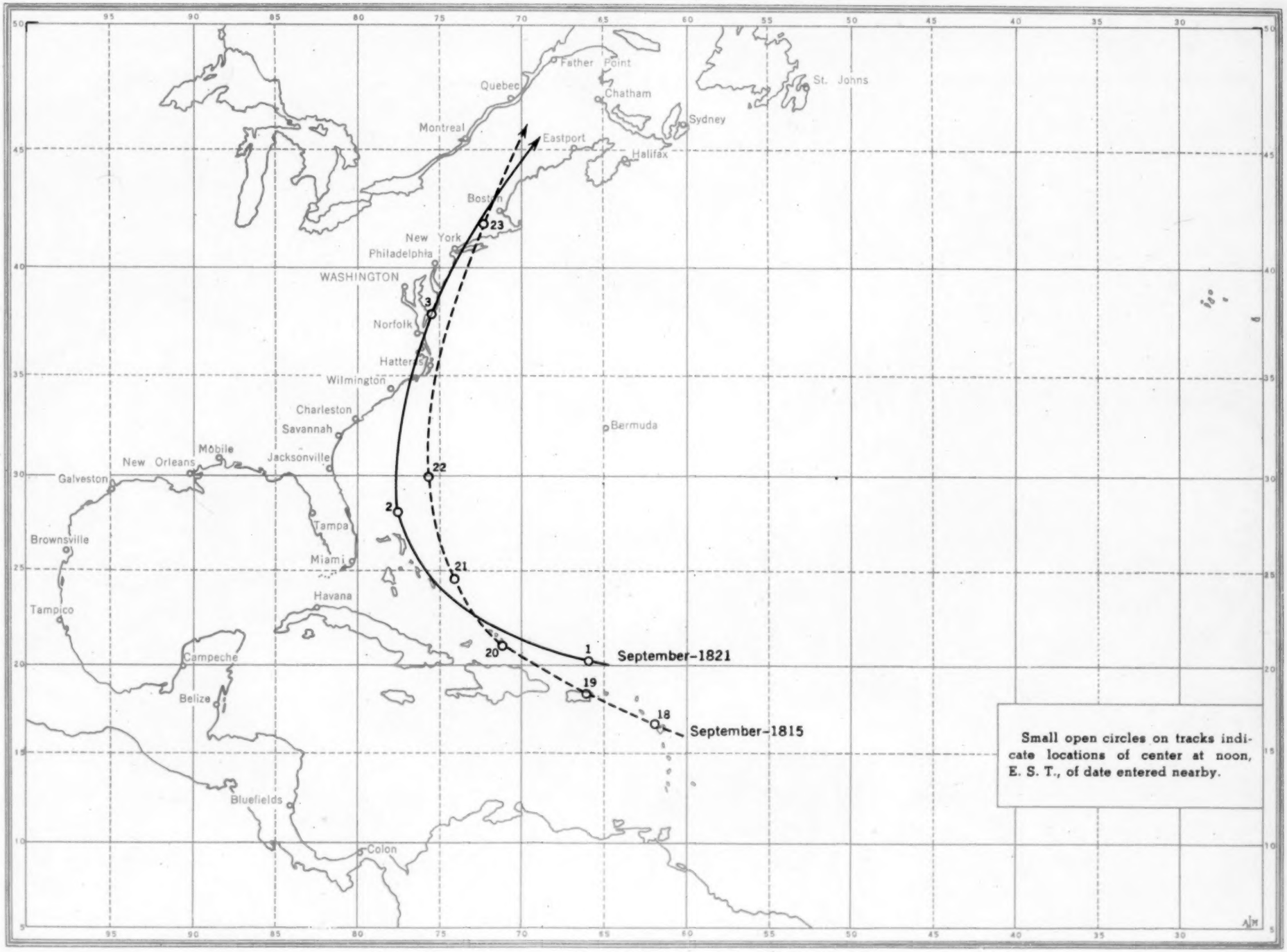


TABLE 1.—*Meteorological data for the hurricane of Sept. 8–16, 1944, E. S. T.*[1]

Station	Lowest pressure	Time of lowest pressure	Velocity and direction at time of lowest pressure	Maximum wind velocity and direction for a 5-minute period	Time of maximum velocity	Extreme wind velocity and direction (fastest mile from register)	Time of extreme velocity	Velocity of extreme gust	Duration in hours of winds over 38 miles per hour
Hatteras, N. C.	27.97	8:20 a		90[2] W[3]	10:00 a	110[2] W			5
Elizabeth City, N. C.	28.88	10:35 a		70 NNW	10:30 a	75		84 I	6¼
Norfolk, Va.	29.11	11:45 a		56 NW	11:50 a	73		90[3]	4
Cape Henry, Va.	28.86	12:10 p		85 NW[4]	12:22 p	134	1:13 p	150[3]	7
Atlantic City, N. J.	28.73	5:00 p		82 N[4]	4:30 p	91 NE	4:30 p		7
Trenton, N. J.	29.18	5:40 p		49 N	5:43 p	54		66 I	3
Philadelphia, Pa.	29.31	6:40 p		32 N	5:33 p	34		60 I	
New York, N. Y.	29.08	7:15 p		81 N[4]	7:27 p	99			5
New Haven, Conn.	28.86	8:50 p	26 NNE	33 N	11:38 p	38 NE	8:09 p	65 I	0
Hartford, Conn.	28.94	9:50 p	41 N	50 N	10:03 p	62 N	10:05 p	109[4] N I	3¼
Fishers Island, N. Y.	28.41	9:45 p	17 NE	78				96	
Block Island, R. I.	28.34	10:09 p	38 SW	82 SE[4]	9:30 p	88 SE	9:31 p		7
Providence, R. I.	28.48	11:20 p	20 NW	43 SE	10:04 p	49	10:04 p	90 ESE	2
Nantucket, Mass.	29.04	11:28 p	54 SW	57 SW	11:47 p	79	12:45 a	90[3] I	
Fall River, Mass.	28.53	10:30 p	— ESE						
Worcester, Mass.	28.92	10:50 p	— NNE						
South Weymouth, Mass.	28.55								
Blue Hill, Mass.	28.62	12:11 a	12 NW	67	10:40 p	77	10:43 p		
Boston, Mass.	28.62	12:25 a	15 NNE	60 NE	10:23 p	72 NE	10:28 p	96 I	8h.–17 m.
Concord, Mass.	28.78	1:10 a	26 N	60	9:45 p	65	9:48 p		
Gloucester, Mass.	28.61	12:40 a	20 NE[2]	70[2]	10:50 p				
Rockport, Mass.	28.59	1:00 a	15 ENE	70 E	1:35 a			80	
Concord, N. H.	29.16	1:45 a		41 NE	12:05 a	47		55 H R	2
Portland, Maine	29.01	3:10 a	26 N	40 NE	1:08 a	50	1:08 a	60[3]	1
Bangor, Maine	29.14	6:00 a	15 NNW	40	7:30 a	58	7:00 a	72	
Eastport, Maine	29.01	8:00 a	4 WSW	30 E	3:50 a	40	3:52 a		0.2
Millinocket, Maine	29.37	7:30 a	19 NNE	25	6:30 a				
Houlton, Maine	29.37	7:40 a	18 N	22	6:26 a	33	6:32 a		
Extreme pressure and highest velocities	27.97			90[2] W		134		150[3]	7

[1] Data represents observations taken on the 14th and 15th of September.
[2] Estimated.
[3] Indicator failed before highest velocity.
[4] Clocked for 4 seconds (10:07 p).
[5] Equals or exceeds all previous records.
I Wind taken from indicator.
H R Wind taken from hourly record.

TABLE 2.—*Comparative data on the hurricanes of Sept. 17–21, 1938, and Sept. 8–16, 1944*

Storm	1938	1944
Date	Sept. 17–21, 1938	Sept. 8–16, 1944.
Place where first reported	Near 21° N., 52° W.	Located by aircraft reconnaissance near 22.5° N., 62.5° W.
Coast lines crossed	New York and Connecticut.	New York, Connecticut, Rhode Island, Massachusetts, and Maine.
Lowest barometer reported at sea.	943.1 millibars (27.85 inches) S. S. *Carinthia*.	
Lowest barometer reported along coast.	946.2 millibars (27.94 inches) at Bellport Coast Guard Station, Long Island, N. Y.	947.2 millibars (27.97 inches) at Hatteras, N. C.
Maximum wind velocity and direction for a 5-minute period.	87 miles per hour from the southwest at Providence, R. I., Blue Hill, 121 S.[1]	Estimated 90 miles per hour from the west at Hatteras, N. C.
Extreme wind velocity and direction (fastest mile from register).		134 miles per hour at Cape Henry, Va.
Velocity of extreme gust	186[1] miles per hour at Blue Hill Observatory, Milton, Mass.	Estimated 150 miles per hour at Cape Henry, Va.
Place of dissipation	Ontario, Canada	Merged with extra-tropical LOW in the north Atlantic ocean southeast of Greenland.
Number of persons killed	494 lives lost in New York and the New England States.	46 lives lost along the east coast. 344 lost at sea.
Estimated damage	$250,000,000 to $350,000,000	Approximately $100,000,000.

[1] The extremely high wind at Blue Hill at some distance from the hurricane center, can partially be attributed to the upslope effect at that station. Winds at the level of the surrounding country were considerably lower.

TABLE 3.—*Storm tides during the hurricanes of Sept. 17–21, 1938, and Sept. 8–16, 1944*

Station	1938		1944	
	Highest tide[1]	Time of highest tide (E. S. T.)[2]	Highest tide[1]	Time of highest tide (E. S. T.)[2]
	Feet		*Feet*	
Hatteras, N. C.	5.0	8:00 a. m.	7.0	9:30 a. m.
Norfolk, Va.	4.4	1:30 p. m.	5.8	12:30 p. m.
Cape Henry, Va.	4.0	10:15 a. m.	[3] 3.6	12:45 p. m.
New York, N. Y.	6.4	4:30 p. m.	6.4	8:30 p. m.
New Haven, Conn.	9.4	9:00 p. m.	10.5	10–11 p. m.
Providence, R. I.	17.6	6:00 p. m.	12.0	10:45 p. m.
Boston, Mass.	11.3		11.4	10:45 p. m.

[1] Height above mean low tide.
[2] Storm tides for the 1938 hurricane were observed on Sept. 21 and those for 1944 on Sept. 14.
[3] Estimated.

TABLE 4.—*Fatalities, casualties, and property damage in the hurricane of Sept. 8–16, 1944*[*]

State	Killed	Injured	Homes destroyed	Homes damaged	Other buildings destroyed	Other buildings damaged	Boats destroyed	Boats damaged
Connecticut	4	0	60	5,136	500	4,550		
Delaware	0	0	0	1,800		850	0	
Maryland	0	0	0	650	15	300		
Massachusetts	26	9	230	3,898	158	915	110	534
New Jersey	9	320	463	3,066	217	635	21	101
New York	6	1	117	2,427	272	852		
North Carolina	1	4	28	316	80	351		
Rhode Island	0	4	23	5,525	368	7,597		
Virginia	0	0	0	1,350	31	782		
Total	[1] 46	338	921	24,168	1,641	16,832	131	635

[1] A release by the public relations office of the fifth Naval district lists 344 men, dead or missing, from 5 vessels wrecked and sunk during the hurricane of Sept. 8–16, 1944. The casualties were from the destroyer *Warrington*, the Coast Guard cutters *Jackson* and *Bedloe*, the light vessel *Vineyard Sound*, and the minesweeper *YMS-409*. The cutters capsized and sank while protecting a Liberty Ship torpedoed off the North Carolina coast, and the light vessel dragged anchor and sank about 2 miles to the northeastward of her station off Martha's Vineyard, Mass.

Fatalities, casualties, and property damage in the hurricane of Sept. 17–21, 1938[*]

State	Killed	Injured	Homes destroyed	Homes damaged	Other buildings destroyed	Other buildings damaged	Boats destroyed	Boats damaged
Connecticut	97	109	101	1,878	1,235	2,301		
Massachusetts	117	331	298	3,021	1,111	2,406		
New Hampshire	12	32	31	1,051	292	1,133		
New Jersey	0	0	0	2	0	0		
New York	60	31	57	405	156	173		
Rhode Island	207	204	441	1,378	677	719		
Vermont	1	1	8	284	93	388		
Total	494	708	936	8,019	3,564	7,120	2,605	3,369

[*] Condensed from reports released by the American Red Cross.

METEOROLOGICAL AND CLIMATOLOGICAL DATA FOR SEPTEMBER 1944

[Climate and Crop Weather Division, W. A. Mattice, Acting in charge]

AEROLOGICAL OBSERVATIONS

TABLE 1.—*Mean free-air barometric pressure in millibars, temperature in degrees Centigrade, and relative humidities in percent, obtained by radiosondes during September 1944*

STATIONS AND ELEVATIONS IN METERS ABOVE SEA LEVEL

Altitude (meters) m. s. l.	Albany, N. Y. (86 m.)				Albuquerque, N. Mex. (1,620 m.)				Apalachicola, Fla. (5 m.)				Atlanta, Ga. (300 m.)				Big Spring, Tex. (774 m.)				Bismarck, N. Dak. (505 m.)				Boise, Idaho (868 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	28	1,007	14.3	89	28	838	20.5	44	30	1,015	25.6	84	28	982	21.6	80	30	927	23.0	57	30	955	13.0	77	30	915	18.1	44
500	28	959	14.8	75	----	----	----	----	30	959	23.8	75	28	960	21.9	73	----	----	----	----	----	----	----	----	----	----	----	----
1,000	28	904	12.0	73	----	----	----	----	30	906	20.5	75	28	906	19.2	72	30	903	22.3	54	30	901	13.5	59	30	901	20.0	36
1,500	28	851	9.2	69	----	----	----	----	30	855	17.4	72	28	855	15.9	71	30	853	19.0	56	30	849	10.2	60	30	851	17.0	35
2,000	28	801	6.7	68	28	802	19.1	41	30	806	14.6	65	28	806	13.0	67	30	804	16.0	51	30	799	7.2	56	30	801	13.2	37
2,500	28	754	4.4	64	28	756	15.6	44	30	760	12.1	58	28	759	10.4	57	30	758	13.2	46	30	751	4.7	47	30	754	9.1	41
3,000	28	708	2.0	55	28	713	11.7	47	30	716	9.5	58	28	714	7.8	52	30	714	10.0	45	30	706	1.7	46	30	710	5.4	45
4,000	27	625	−3.5	46	28	631	3.5	57	30	634	4.1	49	28	632	3.0	37	30	632	4.0	33	30	624	−4.0	45	30	628	−1.7	46
5,000	27	550	−8.6	36	28	558	−3.5	52	30	560	−1.4	50	28	558	−2.7	33	29	559	−1.9	31	30	549	−10.1	41	30	553	−8.5	43
6,000	26	483	−15.2	----	28	491	−10.3	48	30	493	−7.2	43	28	491	−8.9	32	29	492	−7.9	31	30	481	−16.6	43	30	485	−15.3	39
7,000	25	422	−22.4	----	28	430	−16.6	44	30	433	−13.4	39	27	431	−15.4	----	29	432	−14.1	----	30	421	−24.0	43	30	424	−22.3	36
8,000	25	368	−29.7	----	27	376	−23.6	----	30	379	−20.4	42	27	377	−22.3	----	29	378	−21.1	----	30	365	−31.7	43	30	369	−29.6	----
9,000	23	319	−37.0	----	27	326	−31.2	----	30	330	−27.7	44	26	328	−29.4	----	29	328	−28.5	----	30	316	−39.6	----	29	320	−37.1	----
10,000	23	275	−44.3	----	26	283	−38.4	----	30	287	−35.2	----	25	285	−36.5	----	29	286	−36.0	----	30	273	−47.3	----	29	277	−43.3	----
11,000	23	237	−50.1	----	25	244	−45.3	----	30	248	−42.9	----	25	246	−44.0	----	29	247	−43.7	----	28	234	−52.4	----	27	238	−48.8	----
12,000	22	202	−54.4	----	26	210	−51.4	----	27	213	−50.3	----	22	211	−51.1	----	28	212	−51.0	----	25	200	−54.5	----	25	204	−52.8	----
13,000	21	173	−56.9	----	24	179	−57.0	----	23	183	−57.1	----	20	181	−57.3	----	27	182	−58.1	----	20	172	−55.4	----	22	175	−55.5	----
14,000	15	147	−58.8	----	20	153	−62.5	----	11	156	−62.7	----	14	154	−62.9	----	16	154	−64.5	----	13	147	−56.4	----	16	149	−57.1	----
15,000	9	125	−60.6	----	8	130	−65.9	----	----	----	----	----	11	131	−67.6	----	8	131	−68.9	----	8	126	−58.5	----	9	126	−58.2	----
16,000	7	107	−61.6	----	----	----	----	----	----	----	----	----	7	111	−69.4	----	----	----	----	----	----	----	----	----	----	----	----	----

Altitude (meters) m. s. l.	Brownsville, Tex. (6 m.)				Buffalo, N. Y (221 m.)				Caribou, Maine (193 m.)				Charleston, S. C. (14 m.)				Denver, Colo. (1,616 m.)				Dodge City, Kans. (787 m.)				El Paso, Tex. (1,195 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	30	1012	26.0	87	30	991	15.1	84	29	993	12.0	90	28	1,014	22.6	93	30	839	17.0	43	30	924	18.3	70	30	881	22.6	05
500	30	957	23.2	80	30	959	15.2	76	29	958	12.4	80	28	959	22.4	82	----	----	----	----	----	----	----	----	----	----	----	----
1,000	30	904	20.2	73	30	904	12.4	73	29	902	9.7	77	28	906	20.0	77	----	----	----	----	30	902	19.7	59	----	----	----	----
1,500	30	853	17.4	67	30	851	9.5	72	29	850	6.9	76	28	855	17.1	76	----	----	----	----	30	851	17.9	49	30	851	22.1	45
2,000	30	804	14.9	59	30	801	6.8	68	29	799	4.3	68	28	806	14.2	70	30	802	17.5	35	30	802	15.3	46	30	803	18.5	48
2,500	30	757	12.4	54	30	753	4.2	59	29	751	2.0	59	28	759	11.4	71	30	756	14.0	37	30	756	12.2	44	30	757	14.8	51
3,000	30	713	9.6	56	30	708	1.9	46	29	706	−0.5	52	28	715	8.7	67	30	712	9.9	41	30	712	9.0	44	30	714	11.2	53
4,000	30	632	4.2	50	30	625	−3.5	38	29	622	−5.6	40	28	633	3.3	62	30	630	2.4	48	30	630	2.0	42	30	632	4.1	53
5,000	29	558	−1.1	39	30	550	−9.4	34	29	547	−11.6	31	27	559	−1.9	60	30	556	−5.5	54	30	556	−4.7	41	30	559	−2.4	47
6,000	29	492	−6.8	35	30	482	−15.9	33	29	479	−18.5	37	26	492	−7.8	49	30	489	−12.6	43	29	489	−10.8	32	30	492	−8.2	38
7,000	29	432	−13.0	31	30	422	−23.0	36	29	418	−25.7	44	25	433	−13.9	51	30	428	−19.7	----	29	429	−17.6	----	30	432	−14.5	38
8,000	29	378	−19.9	30	30	367	−30.2	41	29	363	−32.9	----	25	378	−20.7	44	30	374	−27.0	----	30	374	−25.2	----	30	377	−21.2	----
9,000	29	329	−27.5	33	30	318	−37.4	----	29	315	−40.1	----	24	329	−27.7	45	29	324	−34.4	----	29	325	−32.6	----	30	328	−28.5	----
10,000	28	285	−35.2	----	30	275	−43.9	----	29	271	−46.0	----	24	286	−35.2	----	28	281	−41.7	----	28	282	−40.4	----	29	285	−36.0	----
11,000	28	247	−42.8	----	30	236	−49.3	----	29	233	−50.4	----	23	247	−42.7	----	27	242	−48.8	----	28	243	−47.6	----	28	246	−43.6	----
12,000	27	213	−50.4	----	29	202	−53.9	----	29	199	−53.2	----	19	212	−50.1	----	22	206	−54.3	----	26	208	−53.6	----	28	212	−50.9	----
13,000	25	182	−58.1	----	26	173	−55.7	----	26	171	−55.5	----	17	182	−57.7	----	16	176	−57.7	----	25	178	−58.1	----	27	182	−58.0	----
14,000	21	155	−65.6	----	20	149	−57.7	----	23	146	−57.1	----	12	154	−64.5	----	12	150	−60.3	----	21	151	−62.0	----	21	155	−64.0	----
15,000	9	132	−70.0	----	10	127	−58.8	----	11	124	−58.2	----	5	128	−69.9	----	----	----	----	----	8	129	−65.5	----	5	131	−66.5	----
16,000	----	----	----	----	----	----	----	----	6	106	−57.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

TABLE 1.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by radiosondes during September 1944*

STATIONS AND ELEVATIONS IN METERS ABOVE SEA LEVEL

Altitude (meters) m. s. l.	Ely, Nev.[1] (1908 m.)				Glasgow, Mont. (648 m.)				Great Falls, Mont. (1128 m.)				Greensboro, N. C. (273 m.)				Hatteras, N. C. (3 m.)				Huntington, W. Va. (172 m.)				Int'l Falls, Minn. (343 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	28	810	14.9	26	30	939	14.9	55	30	887	15.2	47	29	986	18.8	86	30	1,016	22.9	88	30	997	16.6	88	30	974	11.6	85
500													29	960	19.6	75	30	960	21.0	77	30	980	18.6	68	30	956	12.4	77
1,000					30	901	14.8	48					29	906	16.8	73	30	906	18.2	73	30	905	15.6	66	30	901	9.6	76
1,500					30	849	11.3	51	30	849	13.8	41	29	855	13.7	75	30	854	15.2	71	30	854	12.0	69	30	848	6.8	75
2,000	28	801	16.4	26	30	799	7.7	54	30	800	10.1	44	29	805	10.6	78	30	805	12.6	69	30	804	8.9	73	30	797	4.4	69
2,500	28	755	15.2	26	30	752	4.4	54	30	752	6.3	50	29	758	8.2	66	30	758	10.3	62	30	756	6.8	61	30	750	2.5	56
3,000	28	712	11.4	26	30	707	1.3	55	30	708	2.7	56	29	713	5.9	57	30	714	7.8	54	30	712	4.7	47	30	705	0.2	55
4,000	28	630	3.3	27	30	624	−4.7	51	29	625	−4.0	57	29	630	0.6	55	30	632	2.4	49	30	629	−0.1	35	30	621	−5.1	50
5,000	28	556	−4.7	29	30	548	−10.7	46	29	550	−10.6	49	28	556	−4.8	43	29	558	−3.3	50	30	554	−5.9	31	29	546	−11.2	43
6,000	26	489	−11.5	31	30	481	−17.5	45	29	482	−17.7	44	28	489	−11.0	47	29	491	−9.1	53	30	487	−12.6	36	28	479	−18.1	43
7,000	25	429	−18.4	28	30	420	−25.0	41	29	421	−25.0	50	28	428	−17.7	42	29	431	−15.2	50	29	427	−18.8	----	28	418	−25.3	----
8,000	24	374	−25.8	28	30	365	−32.3	----	29	366	−31.9	----	28	374	−24.6	36	29	376	−22.1	53	29	372	−26.0	----	28	363	−32.8	----
9,000	22	325	−32.7	24	30	316	−39.9	----	29	317	−39.4	----	28	325	−31.9	----	28	327	−29.8	54	29	323	−33.1	----	28	314	−40.3	----
10,000	22	282	−40.1	----	30	272	−47.1	----	29	273	−46.4	----	28	282	−39.4	----	28	284	−37.3	57	29	280	−40.4	----	28	271	−46.8	----
11,000	19	244	−46.6	----	30	234	−53.1	----	29	235	−51.9	----	27	243	−47.0	----	28	245	−44.9	----	28	242	−47.1	----	24	233	−51.8	----
12,000	19	210	−52.1	----	29	200	−55.4	----	23	200	−54.4	----	26	208	−54.3	----	28	211	−52.5	----	26	207	−53.2	----	23	200	−53.7	----
13,000	15	180	−56.9	----	21	172	−55.8	----	18	172	−56.1	----	25	178	−60.4	----	26	180	−59.2	----	25	177	−58.4	----	17	171	−55.1	----
14,000	11	153	−61.2	----	16	147	−56.6	----	13	146	−57.9	----	17	151	−54.7	----	18	153	−64.2	----	14	152	−61.4	----	5	147	−56.4	----
15,000	7	129	−64.7	----	10	126	−58.2	----	----	----	----	----	9	129	−68.0	----	----	----	----	----	7	130	−65.0	----	5	125	−57.6	----

Altitude (meters) m. s. l.	Jackson, Miss. (97 m.)				Joliet, Ill. (178 m.)				Lake Charles, La. (5 m.)				Lakehurst, N. J.[1] (39 m.)				Little Rock, Ark. (79 m.)				Louisville, Ky. (165 m.)				Mazatlan, Mexico (80 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	29	1,004	23.4	77	30	998	16.1	84	30	1,014	24.5	86	26	1,014	17.9	52	30	1,006	22.7	77	30	997	18.3	84	25	1,001	27.2	83
500	29	958	22.8	69	30	958	17.9	68	30	959	23.6	74	26	960	17.4	74	30	959	23.2	65	30	960	20.0	69	25	955	24.7	80
1,000	29	905	19.3	72	30	904	14.4	70	30	905	20.3	75	26	906	14.4	70	30	905	19.5	71	30	906	16.4	70	25	902	22.5	72
1,500	29	854	16.2	70	30	852	11.8	67	30	855	17.1	71	26	854	11.8	64	30	854	16.5	64	30	854	13.2	68	25	852	19.9	67
2,000	29	805	13.7	64	30	802	9.0	60	30	805	14.4	64	26	804	9.7	51	30	805	13.7	61	30	804	10.8	57	25	804	17.4	60
2,500	29	756	11.1	57	30	754	6.5	50	30	759	11.7	56	26	757	7.1	46	30	758	11.3	49	30	757	8.5	47	25	758	14.9	56
3,000	29	714	8.8	44	30	710	3.9	46	30	715	9.5	45	26	712	4.4	46	30	714	8.6	45	30	713	6.2	39	25	714	11.7	56
4,000	29	632	3.0	41	30	627	−1.6	44	30	633	4.3	37	25	629	−0.5	36	30	632	3.0	30	30	630	0.8	32	23	633	5.1	61
5,000	29	558	−2.1	32	30	552	−7.6	44	30	560	−0.7	32	25	555	−6.3	42	30	558	−2.4	27	30	556	−5.1	32	19	559	−0.5	47
6,000	29	491	−8.3	32	30	485	−13.9	39	30	493	−6.9	31	25	487	−12.6	39	30	491	−9.0	30	30	489	−11.7	----	18	493	−5.9	38
7,000	29	431	−15.0	35	30	424	−20.8	46	30	433	−13.5	36	25	427	−19.3	39	30	431	−15.5	----	30	428	−18.3	----	16	433	−12.1	----
8,000	29	377	−21.7	36	30	370	−28.3	----	30	379	−20.4	----	23	372	−26.4	----	30	377	−22.5	----	28	374	−25.7	----	16	379	−18.6	----
9,000	29	328	−29.2	----	30	320	−36.1	----	30	330	−27.7	----	23	323	−33.7	----	30	328	−29.8	----	28	324	−33.1	----	15	331	−26.3	----
10,000	29	285	−36.5	----	30	277	−43.5	----	30	287	−35.1	----	23	280	−40.9	----	30	285	−36.9	----	28	281	−39.8	----	14	288	−34.1	----
11,000	29	246	−43.8	----	30	239	−49.2	----	29	247	−42.8	----	22	241	−47.2	----	30	246	−44.0	----	28	242	−46.7	----	12	248	−42.8	----
12,000	29	212	−51.2	----	27	204	−54.3	----	29	213	−50.5	----	21	207	−53.2	----	29	212	−50.7	----	27	208	−52.7	----	10	214	−49.7	----
13,000	28	181	−58.4	----	24	175	−57.3	----	25	183	−58.0	----	16	177	−58.1	----	28	181	−57.1	----	26	178	−57.5	----	7	183	−57.6	----
14,000	23	154	−64.5	----	15	150	−59.1	----	18	156	−64.5	----	10	151	−61.2	----	21	154	−62.6	----	17	151	−62.0	----	5	156	−65.4	----
15,000	19	131	−69.2	----	7	126	−59.4	----	13	132	−70.5	----	6	128	−62.5	----	14	130	−66.2	----	7	129	−63.4	----	----	----	----	----
16,000	5	110	−71.0	----	5	108	−59.0	----	5	112	−72.5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

TABLE 1.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent, obtained by radiosondes during September 1944*

STATIONS AND ELEVATIONS IN METERS ABOVE SEA LEVEL

Altitude (meters) m. s. l.	Medford, Oreg.[1] (409 m.)				Merida, Mexico (21 m.)				Miami, Fla. (4 m.)				Nashville, Tenn. (180 m.)				Norfolk, Va.[1] (4 m)				Oakland, Calif. (2 m.)				Ogden, Utah. (1,355 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	30	967	22.4	49	28	1,009	26.9	90	30	1,015	25.9	85	29	996	21.3	79	23	1,017	22.0	82	30	1,011	16.7	75	30	864	16.7	43
500	30	967	22.5	49	28	956	25.0	85	30	960	23.5	83	29	959	20.6	70	23	960	19.3	80	30	955	20.9	40				
1,000	30	903	20.2	41	28	903	22.1	82	30	906	20.3	78	29	908	17.3	74	23	906	16.3	79	30	901	21.2	23				
1,500	30	852	16.4	44	28	852	19.1	79	30	855	17.5	76	29	854	14.2	71	23	855	13.8	80	30	850	18.7	19	30	850	18.6	31
2,000	30	803	12.7	47	28	804	16.4	78	30	806	14.8	70	29	804	11.6	62	23	805	11.8	67	30	801	15.7	19	30	801	16.1	28
2,500	30	756	9.2	47	28	758	13.7	74	30	760	12.2	63	29	757	9.1	55	23	758	9.2	64	30	755	12.3	16	30	755	12.4	31
3,000	30	712	6.5	41	28	714	10.8	71	30	716	9.4	60	29	713	6.6	40	23	714	6.5	58	30	711	8.9	19	30	711	8.3	34
4,000	30	629	0.7	39	28	633	4.9	66	30	634	3.9	47	29	631	1.8	31	21	631	1.3	44	30	629	2.2	19	30	629	0.5	40
5,000	29	555	−5.3	36	28	559	−1.0	62	30	560	−1.5	39	29	556	−4.0	30	20	557	−4.1	44	30	555	−4.6	20	30	554	−6.6	41
6,000	28	488	−12.2	33	27	493	−6.9	60	30	493	−7.1	32	28	489	−10.4	----	20	490	−10.2	50	30	488	−11.3	----	30	487	−13.7	42
7,000	27	428	−19.4	32	27	433	−13.2	57	30	433	−13.4	29	28	429	−17.1	----	20	430	−16.8	56	30	428	−18.3	----	30	426	−20.7	----
8,000	26	374	−26.3	32	27	379	−19.9	56	30	379	−20.0	35	28	375	−24.2	----	11	375	−23.5	----	30	374	−25.7	----	30	371	−28.4	----
9,000	26	324	−34.2	31	26	329	−27.2	50	30	330	−27.2	37	26	326	−31.7	----	11	326	−30.7	----	30	324	−33.0	----	30	322	−36.0	----
10,000	25	281	−41.7	----	26	287	−35.2	46	30	287	−34.9	----	25	283	−39.2	----	10	283	−38.0	----	30	281	−40.4	----	30	278	−43.2	----
11,000	24	242	−48.3	----	26	248	−43.5	----	30	248	−42.7	----	24	244	−46.4	----	9	245	−45.3	----	30	242	−47.4	----	30	239	−49.8	----
12,000	24	207	−53.6	----	25	213	−52.0	----	30	213	−50.4	----	22	209	−52.9	----	7	210	−52.6	----	30	208	−53.4	----	30	205	−54.5	----
13,000	20	177	−57.5	----	25	182	−60.3	----	30	183	−57.7	----	19	179	−58.5	----	6	179	−59.5	----	29	177	−58.4	----	29	175	−58.1	----
14,000	13	152	−59.7	----	19	155	−67.4	----	28	156	−64.2	----	14	153	−63.3	----	----	----	----	----	27	151	−61.1	----	29	149	−61.0	----
15,000	7	130	−61.7	----	11	131	−73.4	----	15	132	−69.4	----	9	130	−65.4	----	----	----	----	----	26	128	−63.6	----	20	128	−63.3	----
16,000	----	----	----	----	----	----	----	----	5	113	−71.8	----	5	111	−67.3	----	----	----	----	----	15	109	−65.1	----	9	108	−64.1	----

Altitude (meters) m. s. l.	Oklahoma City, Okla. (391 m.)				Omaha, Nebr. (301 m.				Pensacola, Fla.[1] (24 m.)				Phoenix, Ariz. (339 m.)				Pittsburgh, Pa. (392 m.)				Portland, Maine [1] (20 m.)				Rapid City, S. Dak.[1] (981 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	30	969	21.2	69	30	979	18.3	79	18	1,016	26.1	81	30	969	28.1	42	29	971	16.9	78	28	1,014	13.1	92	----	----	----	----
500	30	957	21.8	63	30	957	18.4	72	18	962	23.6	80	30	951	30.2	31	29	959	17.1	73	28	958	14.6	79	----	----	----	----
1,000	30	904	19.7	59	30	903	16.1	68	18	909	20.5	79	30	899	26.9	31	29	904	14.6	70	28	903	12.4	74	----	----	----	----
1,500	30	853	17.4	52	30	851	13.5	62	18	858	17.1	81	30	849	22.9	35	29	853	11.4	69	28	851	9.8	72	----	----	----	----
2,000	30	804	15.0	47	30	802	10.9	61	18	808	14.2	75	30	801	18.8	40	29	803	8.4	68	28	801	7.1	69	----	----	----	----
2,500	30	757	12.0	45	30	755	8.3	58	18	762	11.7	65	30	756	14.9	42	29	755	6.1	58	28	754	5.0	63	----	----	----	----
3,000	30	713	8.9	41	30	710	5.8	54	18	718	9.6	58	30	712	11.0	44	29	710	4.0	47	28	708	2.6	59	----	----	----	----
4,000	30	631	2.7	39	30	628	−0.4	52	17	636	4.3	49	30	631	4.1	43	29	628	−0.7	36	26	626	−2.3	50	----	----	----	----
5,000	30	557	−3.2	41	29	553	−6.8	39	16	562	−1.8	38	30	557	−3.0	42	29	553	−6.5	33	25	551	−8.0	43	----	----	----	----
6,000	30	490	−9.5	33	29	486	−13.6	36	16	495	−7.4	----	30	490	−9.5	40	29	486	−12.8	30	25	484	−14.5	41	----	----	----	----
7,000	30	430	−16.3	37	29	425	−20.8	36	15	435	−13.7	----	30	430	−16.2	----	29	426	−19.3	----	24	424	−21.6	38	----	----	----	----
8,000	28	376	−23.3	42	28	370	−28.3	----	14	380	−21.2	----	30	376	−23.4	----	29	371	−26.9	----	24	369	−28.7	40	----	----	----	----
9,000	28	327	−30.6	----	28	321	−35.9	----	14	331	−29.0	----	30	327	−30.7	----	29	322	−34.1	----	24	320	−36.0	----	----	----	----	----
10,000	28	284	−38.1	----	28	278	−42.7	----	14	287	−36.3	----	30	284	−38.1	----	28	279	−41.2	----	23	277	−42.8	----	----	----	----	----
11,000	28	245	−45.2	----	26	239	−48.8	----	14	248	−43.6	----	30	244	−44.7	----	28	246	−47.6	----	21	238	−48.4	----	----	----	----	----
12,000	28	210	−51.7	----	26	205	−53.8	----	14	214	−50.5	----	29	210	−50.8	----	28	205	−53.2	----	18	204	−52.6	----	----	----	----	----
13,000	25	180	−57.7	----	24	175	−57.2	----	14	183	−57.7	----	27	180	−56.6	----	27	176	−57.5	----	17	174	−55.0	----	----	----	----	----
14,000	23	153	−62.5	----	20	149	−58.9	----	10	156	−64.3	----	25	154	−61.7	----	22	150	−60.5	----	11	148	−57.0	----	----	----	----	----
15,000	10	130	−65.9	----	12	127	−61.3	----	5	133	−68.0	----	19	130	−65.9	----	17	128	−62.4	----	5	126	−58.3	----	----	----	----	----
16,000	----	----	----	----	6	108	−62.2	----	----	----	----	----	9	111	−68.0	----	6	110	−64.7	----	----	----	----	----	----	----	----	----

Altitude (meters) m. s. l.	St. Louis, Mo. (171 m.)				St. Paul, Minn. (225 m.)				San Antonio, Tex. (240 m.)				San Diego, Calif.[1] (19 m.)				San Juan, P. R. (15 m.)				Santa Maria, Calif. (71 m.)				S. S. Marie, Mich. (221 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	30	996	19.7	74	30	988	15.8	78	30	986	24.8	71	28	1,010	18.0	83	30	1,012	25.9	86	30	1,004	14.5	87	30	990	11.7	93
500	30	959	19.6	63	30	956	15.2	72	30	957	24.3	68	28	955	17.5	75	30	958	22.9	84	30	955	17.4	71	30	958	12.3	85
1,000	30	904	16.4	63	30	901	12.3	72	30	904	21.0	72	28	901	19.6	45	30	904	19.6	81	30	901	22.1	31	30	902	10.2	77
1,500	30	853	13.3	62	30	849	9.7	68	30	854	17.7	73	28	850	20.3	30	30	854	16.7	77	30	850	19.4	26	30	850	7.7	76
2,000	30	803	10.7	62	30	799	7.4	58	30	805	15.1	63	28	802	17.8	25	30	804	14.0	70	30	802	16.2	25	30	799	5.4	70
2,500	30	755	8.1	49	30	752	5.0	52	30	758	12.6	59	28	756	14.6	24	30	758	11.4	63	30	755	12.8	23	30	752	3.2	69
3,000	30	712	5.8	42	30	707	2.6	45	30	714	10.3	47	28	712	10.7	25	30	714	9.0	54	30	712	9.9	19	30	707	0.8	66
4,000	30	629	−0.2	37	29	624	−3.0	38	29	633	4.6	40	28	630	3.7	26	30	632	3.1	46	30	630	3.4	20	30	623	−4.7	61
5,000	30	554	−6.3	38	29	549	−9.3	39	29	560	−0.8	36	28	557	−2.7	22	29	558	−3.0	47	30	556	−3.8	----	29	548	−10.6	56
6,000	29	487	−12.6	34	29	482	−16.1	36	29	493	−6.3	32	28	490	−9.5	22	29	491	−8.6	37	30	489	−10.2	----	29	481	−17.0	50
7,000	29	427	−19.6	44	29	421	−23.3	34	29	433	−12.9	37	28	430	−16.4	----	29	431	−14.8	41	30	429	−17.5	----	29	420	−24.3	52
8,000	29	372	−27.0	43	29	366	−30.8	----	29	379	−19.7	----	24	375	−23.5	----	29	377	−21.9	34	30	374	−24.5	----	29	365	−31.8	54
9,000	29	322	−34.3	----	29	317	−38.8	----	28	330	−26.8	----	23	326	−31.3	----	29	328	−29.5	----	30	325	−32.1	----	29	316	−39.3	48
10,000	29	279	−41.0	----	29	274	−46.5	----	28	287	−34.4	----	23	285	−38.4	----	29	285	−37.5	----	29	282	−39.5	----	28	272	−46.3	----
11,000	27	241	−47.1	----	29	235	−52.5	----	28	248	−42.0	----	21	244	−45.4	----	28	246	−45.9	----	29	243	−46.8	----	27	234	−51.3	----
12,000	27	207	−53.1	----	29	201	−55.6	----	27	214	−49.6	----	17	210	−51.0	----	28	211	−54.2	----	29	209	−53.1	----	22	200	−52.8	----
13,000	25	177	−57.5	----	25	172	−56.2	----	24	183	−57.0	----	13	179	−57.3	----	28	180	−62.3	----	29	178	−58.3	----	16	172	−53.4	----
14,000	19	151	−60.8	----	23	146	−57.0	----	20	156	−63.2	----	10	153	−61.0	----	21	153	−68.8	----	24	152	−62.6	----	8	148	−55.3	----
15,000	13	128	−63.7	----	13	125	−57.3	----	13	132	−66.7	----	5	130	−65.6	----	7	129	−73.9	----	18	129	−66.2	----	6	125	−56.7	----
16,000	----	----	----	----	6	107	−60.1	----	7	112	−74.3	----	----	----	----	----	----	----	----	----	10	110	−68.6	----	----	----	----	----

TABLE 1.—*Mean free-air barometric pressure in millibars, temperatuae in degrees centigrade, and relative humidities in percent, obtained by radiosondes during September 1944*

STATIONS AND ELEVATIONS IN METERS ABOVE SEA LEVEL

Altitude (meters) m. s. l.	Seattle, Wash.[1] (22 m.)				Spokane, Wash. (598 m.)				Swan Island, West Indies (10 m.)				Tacubaya, Mexico (2306 m.)				Tampa, Fla. (3 m.)				Tatoosh Island, Wash. (31 m.)				Toledo, Ohio (191 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	26	1,013	19.0	65	30	944	17.2	51	23	1,011	27.1	84	30	774	15.0	84	20	1,015	26.4	83	30	1,012	12.6	93	30	994	15.7	79
500	26	958	15.2	65	----	----	----	----	23	956	23.4	83	----	----	----	----	20	959	24.0	78	30	958	13.9	78	30	958	16.9	64
1,000	26	903	13.4	63	30	901	17.6	43	23	904	20.3	77	----	----	----	----	20	906	21.0	75	30	902	12.7	64	30	904	13.2	65
1,500	26	851	11.0	57	30	850	13.6	47	23	853	17.4	72	----	----	----	----	20	855	17.9	72	30	850	10.5	58	30	851	10.0	64
2,000	26	801	8.2	54	30	800	9.5	52	23	804	14.6	70	----	----	----	----	20	806	15.1	62	30	800	7.8	57	30	801	7.2	58
2,500	26	753	5.6	50	30	753	5.6	55	23	758	11.9	64	30	756	13.9	83	20	760	12.6	60	30	753	5.2	52	30	754	5.0	46
3,000	26	709	2.8	49	30	708	2.3	52	23	713	9.2	60	30	713	10.6	84	20	716	9.8	55	30	708	2.5	47	30	709	2.6	35
4,000	26	625	−3.1	44	29	625	−3.8	47	23	631	3.4	53	30	631	4.2	89	20	634	3.8	56	29	625	−3.5	44	30	626	−2.4	27
5,000	25	551	−9.1	40	29	550	−10.0	42	23	557	−2.6	56	30	558	−1.9	90	19	560	−1.8	50	29	550	−10.0	44	30	551	−8.2	30
6,000	25	484	−15.9	42	29	482	−16.5	36	23	491	−8.1	48	30	492	−7.0	74	19	493	−7.3	43	28	482	−16.4	45	30	484	−14.9	34
7,000	24	423	−23.5	47	29	421	−23.8	----	23	431	−14.0	41	30	432	−12.5	62	19	433	−13.8	42	28	421	−23.8	48	30	423	−21.9	34
8,000	24	368	−31.1	----	29	367	−31.6	----	23	377	−20.6	48	30	377	−19.3	62	17	379	−20.6	----	28	367	−31.4	43	30	368	−29.0	34
9,000	24	318	−38.6	----	29	317	−39.1	----	23	328	−27.6	----	30	329	−26.6	69	17	330	−27.9	----	28	317	−38.6	----	30	319	−36.2	----
10,000	23	274	−46.2	----	29	274	−45.7	----	23	285	−35.4	----	30	286	−34.3	68	16	287	−35.3	----	27	274	−45.0	----	30	276	−43.1	----
11,000	22	236	−52.3	----	28	236	−50.8	----	23	246	−43.7	----	30	247	−42.7	----	16	248	−43.0	----	25	236	−50.3	----	30	238	−49.2	----
12,000	22	202	−56.7	----	28	202	−54.5	----	23	212	−52.3	----	29	213	−51.4	----	15	213	−50.8	----	23	202	−54.2	----	29	204	−53.8	----
13,000	21	172	−57.8	----	26	173	−55.7	----	17	181	−60.2	----	24	182	−60.0	----	15	182	−58.2	----	20	173	−55.3	----	24	174	−56.9	----
14,000	19	146	−59.2	----	20	148	−57.0	----	10	154	−66.2	----	10	154	−68.2	----	11	155	−64.8	----	14	149	−58.4	----	17	149	−58.8	----
15,000	18	125	−59.4	----	11	126	−57.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	8	127	−60.6	----
16,000	12	106	−58.6	----	7	107	−57.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	109	−61.9	----
17,000	7	91	−59.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
18,000	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Altitude (meters) m. s. l.	Tongue Point, Oreg.[1] (21m.)				Washington, D. C. (25m.)				Altitude (meters) m. s. l.	Tongue Point, Oreg.[1] (21m.)				Washington, D. C. (25m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity		Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	25	1,017	15.5	85	30	1,014	20.3	78	8,000	21	369	−30.9	------	30	373	−25.5	48
500	25	962	15.2	73	30	960	18.3	71	9,000	21	319	−38.6	------	30	324	−32.8	------
1,000	25	906	13.4	63	30	906	15.6	71	10,000	21	276	−45.0	------	30	281	−39.9	------
1,500	25	854	10.8	58	30	854	12.6	72	11,000	17	238	−50.2	------	30	242	−46.6	------
2,000	25	804	8.2	53	30	804	9.9	67	12,000	16	204	−54.7	------	30	208	−53.1	------
2,500	25	756	5.5	46	30	757	7.0	64	13,000	14	175	−56.4	------	30	178	−58.6	------
3,000	25	711	2.9	42	30	712	5.0	53	14,000	13	150	−57.4	------	26	151	−62.5	------
4,000	24	627	−3.0	38	30	629	.2	52	15,000	11	128	−58.7	------	15	128	−65.5	------
5,000	24	552	−9.7	34	30	555	−5.4	48	16,000	8	109	−60.7	------	10	108	−66.2	------
6,000	24	485	−16.6	------	30	488	−11.6	46	17,000	----	----	----	----	7	91	−65.7	------
7,000	24	423	−24.0	------	30	428	−18.3	44									

[1] U. S. Navy.
[2] Humidity data obtained by hair hygrometer, others using electric hygrometer.
[3] Insufficient observations.
[4] No observations taken.
[5] Data not received.

NOTE.—All observations taken near 11 p. m., E. S. T. except at Mazatlan and Merida where they are taken near 9 p. m.
"Number of Observations" refers to pressure only, as temperature and humidity data are sometimes missing for some observations at certain levels. Relative humidity data are not used in daily observations when the temperature is below −40.0°C.
None of the means included in these tables are based on less than 15 surface or 5 standard level observations.
Means for observations obtained by the electric hygrometer have been adjusted to compensate for the values occuring below the operating range of the humidity element.

TABLE 2.—*Free-air resultant winds based on pilot-balloon observations made near 5 p. m. (75th meridian time) during September 1944. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Velocities in meters per second*

Altitude (meters) m. s. l.	Abilene, Tex. (538 m.)			Albuquerque, N. Mex. (1,630 m.)			Atlanta, Ga. (299 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (870 m.)			Brownsville, Tex. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (132 m.)			Charleston, S. C. (17 m.)			Cincinnati, Ohio (152 m.)			Denver, Colo. (1,627 m.)			El Paso, Tex. (1,196 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	30	123	3.6	29	195	2.0	26	28	1.1	29	286	1.0	30	112	0.4	30	328	4.1	30	86	4.1	29	256	2.6	29	248	1.2	26	135	0.4	30	246	1.1	30	60	2.7	30	135	1.5
500	----	----	----	----	----	----	26	11	1.1	----	----	----	----	----	----	----	----	----	30	89	4.7	29	247	2.8	29	214	3.0	26	155	1.7	30	248	2.4	----	----	----	----	----	----	----	----	----
1,000	30	158	3.3	----	----	----	26	293	1.1	----	----	----	29	297	0.8	30	322	3.9	29	87	3.7	27	251	4.1	28	234	5.2	23	204	1.6	30	251	2.3	----	----	----	----	----	----	----	----	----
1,500	28	165	3.5	----	----	----	25	287	0.9	29	272	2.5	28	280	1.6	30	294	2.7	27	98	2.7	22	246	4.8	25	244	5.4	23	247	2.3	28	266	3.4	----	----	----	30	138	2.0
2,000	27	178	3.4	29	196	2.6	22	287	1.6	29	287	3.2	23	252	4.0	30	271	2.6	25	87	2.8	22	257	6.1	24	250	6.2	23	283	3.0	25	275	3.7	30	53	2.6	30	146	1.3
2,500	26	181	3.8	29	204	2.2	20	300	2.3	29	289	4.7	20	274	5.3	29	274	2.5	22	106	1.9	18	259	6.7	18	251	6.7	19	270	4.2	20	274	5.1	30	71	1.6	29	155	1.7
3,000	24	201	3.3	29	221	2.5	18	301	2.7	27	275	6.1	17	279	7.8	29	275	3.2	21	106	2.2	17	275	8.6	14	250	4.4	18	257	5.1	18	274	4.9	30	215	0.2	29	180	1.7
4,000	23	257	2.9	24	262	3.8	13	301	5.0	25	277	7.9	17	279	11.3	27	287	4.8	18	120	2.4	10	285	9.3	11	278	5.2	15	264	6.8	11	294	9.2	29	271	5.2	22	238	3.5
5,000	23	262	3.7	22	269	5.2	10	289	7.6	20	281	8.8	14	281	13.9	24	274	6.7	16	140	1.7	----	----	----	11	272	6.5	10	251	5.6	----	----	----	26	276	8.3	14	246	4.3
6,000	20	270	4.8	21	262	6.4	----	----	----	18	290	10.2	11	290	12.8	23	273	8.1	13	186	1.1	----	----	----	----	----	----	----	----	----	----	----	----	27	274	9.8	13	247	5.9
8,000	18	263	10.5	18	262	13.1	----	----	----	14	304	10.3	10	288	14.5	18	278	12.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	22	265	16.1	----	----	----	----	----	----
10,000	14	276	13.9	14	265	15.6	----	----	----	12	300	12.0	----	----	----	11	275	15.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	18	263	17.8	----	----	----	----	----	----
12,000	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	12	265	23.9	----	----	----	----	----	----

TABLE 2.—*Free-air resultant winds based on pilot-balloon observations made near 5 p. m. (75th meridian time) during September 1944. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Velocities in meters per second*—Continued

Altitude (meters) m. s. l.	Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,413 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (16 m.)			Joliet, Ill. (178 m.)			Las Vegas, Nev. (573 m.)			Little Rock, Ark. (58 m.)			Medford, Oreg. (410 m.)			Miami, Fla. (15 m.)			Mobile, Ala. (66 m.)			Nashville, Tenn. (194 m.)			New York, N. Y. (15 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	30	282	1.8	30	307	2.3	29	284	0.2	30	270	2.9	30	100	2.6	30	210	1.6	30	170	1.1	29	168	0.5	29	306	1.5	30	124	2.3	25	127	0.7	29	352	1.3	25	197	1.1
500							29	254	0.4				30	105	2.3	30	239	2.7				29	183	0.7	29	311	1.6	30	99	4.1	25	119	0.9	29	322	1.1	25	249	1.7
1,000							27	261	1.7	30	261	3.4	30	136	1.7	30	231	3.3	30	175	1.9	29	209	0.4	29	324	1.8	30	94	3.1	23	64	0.4	29	284	1.4	23	295	2.5
1,500				30	299	2.7	26	269	0.3	30	262	4.2	29	208	1.4	28	249	5.4	30	187	2.3	29	265	0.9	29	295	0.7	28	87	1.9	19	51	1.7	28	262	2.0	22	294	3.2
2,000	30	278	1.8	30	276	3.5	22	274	5.1	29	263	5.6	27	234	2.9	24	248	7.3	30	204	2.4	25	257	1.9	29	219	0.9	25	83	1.8	16	33	2.2	24	241	2.4	21	285	4.5
2,500	30	282	1.7	30	267	3.1	18	276	6.4	26	273	6.7	24	241	4.1	20	257	8.0	30	228	2.9	23	269	3.5	27	189	1.4	23	99	1.7	11	334	2.0	24	259	3.5	18	279	5.9
3,000	30	259	2.4	30	266	3.8	16	274	7.4	22	277	7.5	23	257	3.4	18	278	8.6	30	244	3.1	21	275	3.5	26	245	1.2	22	96	2.4				24	263	4.9	14	281	5.4
4,000	29	239	3.3	26	265	5.6	14	270	8.9	17	283	7.8	19	253	3.4	12	263	13.3	30	239	4.4	19	274	5.1	23	233	3.6	22	99	1.4				19	276	7.7	10	284	5.0
5,000	28	265	5.7	20	288	5.1	11	268	10.7	11	283	6.2	15	274	2.9				28	239	4.7	17	286	7.1	21	229	3.6	22	102	2.4				15	279	7.4			
6,000	27	270	7.1	14	285	7.4	10	263	11.9				13	273	2.3				28	251	5.0	13	289	8.6	20	244	2.7	21	77	3.2				12	292	8.6			
8,000	23	271	8.7										10	286	3.1				25	261	6.9				16	261	6.0	15	74	4.9									
10,000	19	277	11.9																22	262	11.5				14	256	11.2	12	82	8.3									
12,000	13	286	11.2																22	267	14.4				11	263	15.4												
14,000																			18	281	13.6																		

Altitude (meters) m. s. l.	Oakland, Calif. (8 m.)			Oklahoma City, Okla. (402 m.)			Omaha, Nebr. (306 m.)			Phoenix, Ariz. (338 m.)			Rapid City, S. Dak. (982 m.)			St. Louis, Mo. (181 m.)			St. Paul, Minn. (225 m.)			San Antonio, Tex. (240 m.)			San Diego, Calif. (15 m.)			Sault Ste. Marie, Mich. (225 m.)			Seattle, Wash. (12 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (24 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	30	286	4.4	27	100	2.5	30	180	1.4	30	232	0.7	30	360	1.2	28	222	1.3	30	216	1.3	30	99	1.9	15	254	3.5	30	308	0.5	29	251	1.9	30	249	2.6	29	41	0.4
500	30	307	3.7	27	100	2.6	30	188	1.9	30	222	0.9				28	226	1.6	30	240	1.9	30	116	2.2	15	294	2.0	30	67	0.1	29	217	1.7				29	287	0.8
1,000	30	340	3.2	27	182	3.1	29	196	3.3	30	183	1.4	30	1	1.1	28	220	2.3	26	238	2.8	28	115	2.3				25	236	2.7	23	236	2.3	30	235	3.5	26	261	2.4
1,500	30	320	3.8	26	188	4.2	28	215	4.6	30	164	1.7	30	333	1.8	27	236	2.9	24	247	3.4	28	116	2.0				23	250	4.6	23	232	3.1	30	238	3.7	25	257	3.7
2,000	30	334	3.4	25	214	4.0	26	249	5.5	30	142	1.7	30	292	2.3	26	262	4.2	20	254	6.7	27	147	1.8				20	257	5.9	21	235	3.0	28	246	4.8	21	280	4.8
2,500	30	323	2.9	25	236	4.4	25	264	7.0	30	144	1.3	27	266	4.9	24	275	5.1	17	267	8.1	25	150	1.6				16	264	5.1	21	252	3.4	25	257	4.7	19	283	6.6
3,000	30	319	2.2	25	255	4.3	25	273	7.3	29	94	0.9	26	271	7.4	23	278	5.4	15	275	8.5	21	215	1.3				13	276	6.7	20	263	4.6	22	278	3.4	18	282	9.1
4,000	29	302	2.3	24	261	5.3	19	278	8.1	29	149	0.8	25	278	10.2	18	287	7.2	11	285	11.1	17	256	2.9							16	276	5.1	20	270	5.1	16	289	11.0
5,000	27	290	3.7	22	284	7.3	16	279	9.9	25	184	0.7	20	277	11.4	17	281	9.1	11	279	13.8	14	291	2.8							14	262	5.1	19	275	6.4	10	279	12.3
6,000	26	287	4.5	22	282	10.0	12	277	9.7	22	238	3.9	17	283	12.2	16	282	12.0	10	281	14.2	11	288	6.1										19	286	6.9			
8,000	24	286	6.3							21	244	6.6	12	290	13.7	12	283	15.1																15	285	8.7			
10,000	19	301	11.9							20	244	11.5				11	280	20.1																13	272	11.3			
12,000	12	281	10.6							18	249	17.3																											
14,000										13	246	16.4																											

TABLE 3.—*Maximum free air wind velocities (m. p. s.) for different sections of the United States based on pilot balloon observations during September 1944*

Section	Surface to 2,500 meters (m. s. l.)					Above 2,500 to 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station
Northeast [1]	32.1	W.	1,365	29	Boston, Mass.	46.2	W.	4,777	22	Point Judith, R. I.	76.2	W.	14,302	16	Portland, Maine.
East-Central [2]	31.0	NNE	1,949	14	Richmond, Va.	32.0	NNW	4,699	3	Washington, D. C.	62.4	WSW.	14,172	10	Huntington, W. Va.
Southeast [3]	26.4	SSE.	818	1	Charleston, S. C.	23.1	WSW.	4,788	14	Birmingham, Ala.	52.2	W.	22,486	5	Jacksonville, Fla.
North-Central [4]	37.0	SW.	1,873	17	Int. Falls, Minn.	35.0	NW.	5,000	21	St. Paul, Minn.	49.6	W.	12,705	2	St. Paul, Minn.
Central [5]	36.8	SW.	1,412	2	Dodge City, Kans.	31.0	WNW.	4,382	4	Indianapolis, Ind.	49.6	WSW.	11,901	28	Omaha, Nebr.
South-Central [6]	28.7	SSE.	1,134	2	Laredo, Tex.	24.0	WSW.	2,946	3	Tulsa, Okla.	44.0	WSW.	8,989	29	Abilene, Tex.
Northwest [7]	35.8	W.	2,477	19	Havre, Mont.	40.0	WSW.	4,581	13	Ellensburg, Wash.	74.0	SW.	9,128	17	Great Falls, Mont.
West-Central [8]	33.2	S.	2,214	30	Grand Junction, Colo.	50.0	SSW.	4,339	21	Elko, Nev.	61.0	W.	11,200	1	Ely, Nev.
Southwest [9]	40.0	SSE.	2,500	20	Sandberg, Calif.	42.0	SSE.	2,662	20	Sandberg, Calif.	58.8	SW.	11,668	19	Santa Maria, Calif.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, Southern Ohio, Kentucky, eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dkaota,
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, northern Nevada, and northern California.
[9] Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.

RIVER STAGES AND FLOODS

By BENNETT SWENSON

RELIEF from drought conditions in the Eastern States and record-breaking floods in the James and Roanoke River Basins in Virginia were dominant features during September. Heavy rains near the middle of September along the North Atlantic Coast associated in part with a severe hurricane passing up the coast were followed by heavy rains of unusual intensity in Virginia.

Over the country as a whole, precipitation during September was above normal in most of the Atlantic and East Gulf States, and in Tennessee, Kentucky, West Virginia, Michigan, Arizona, New Mexico, and Washington, and below normal in the remainder of the country. The precipitation pattern during September was almost an exact reversal of that which has persisted since April except in the northern Ohio Basin where Indiana and Ohio continued well below normal in September. Flooding was confined mainly to the middle Atlantic coast drainage, Kansas and Texas.

Atlantic slope drainage.—Generally the streams in the drainage area continued to subside slowly at abnormally low levels until September 12 when a series of heavy rains produced moderate rises. Unusually heavy rains on September 17–19 in southern and central Virginia resulted in record-breaking floods in the James and Roanoke River Basins, causing considerable crop loss and property and highway damage.

Generally heavy rains during the period September 12–15 preceded and accompanied the passage of a severe hurricane along the Atlantic coast from North Carolina northward. (A complete report of the hurricane is given in another section of this Review.) On September 12 and 13 rainfall amounts of about 2 inches occurred along the Atlantic coast from Virginia northward. On the morning of September 14, the hurricane passed over Cape Hatteras, N. C., was centered 12 hours later just south of Long Island, and on the morning of September 15 it was located a short distance south of Eastport, Maine, having passed over Boston, Mass., about midnight. The rains associated with this storm amounted to as much as 5 inches from New Jersey to New England. Because of the depleted state of the ground moisture prior to the storm only moderate rises resulted from these rains and floods did not materialize.

On September 17–18 a persistent high-pressure area centered over northern New England produced a deep current of easterly and south-easterly winds at the surface and aloft over southern Virginia. This strong convergent flow, together with orographic lifting, resulted in exceptionally intense rains along the foothills of the western Piedmont section east of the Blue Ridge. The heaviest precipitation was confined to an area from Charlottesville, Va., southward to Randolph, Va., and westward to Balcony Falls, Va.

The center of maximum rainfall appears to have been in the vicinity of Covesville, Va., where unofficial measurements indicated more than 18.5 inches. At Rockfish, Va., an official observing station, 14.26 inches of rain was recorded. Records from this station show that from 4 p. m. to 6:30 p. m. September 18 the intensity was about 2.6 inches per hour and from 6:30 p. m. to 10 p. m. the rate averaged 1.1 inches per hour. Previous to 4 p. m. the rain was light. Other rainfall totals for the storm period, September 17–19, are as follows: Charlottesville, Va., 10.97 inches; Afton, Va., 10.72 inches; North Garden, Va., 12.91 inches; Randolph, Va., 9.45 inches; Balcony Falls, Va., 9.12 inches; and Tye River, Va., 6.81 inches. This rainfall, following the heavy rains of September 12–15, occurred on ground already well saturated and resulted in high run-off. As a result the tributaries of the James River from below Lynchburg to a point above Cartersville, Va., reached exceptionally high stages. The United States Geological Survey reported Hardware River rose about 10 feet above any previously recorded stage. Rainfall was relatively light in the headwaters of the James River and flood stage was not reached at or above Lynchburg. Downstream the river reached 26.0 feet at Scottsville, Va., and 34.4 feet at Bremo Bluff, Va., 0.2 foot and 0.9 foot, respectively, above the previous record of August 1940. At Columbia, Va., the river crested at 37.4 feet, 1.6 feet above the March 1936 flood, and at Cartersville, the crest of 29.6 feet exceeded the peak of the March 1936 flood by 0.8 foot. Since the rainfall was light from Columbia downstream, the crest leveled off rapidly as it moved downstream and the peak of 22.4 feet at Richmond was considerably below the crests of the March 1936 and April 1937 floods and about the same as the August 1940 flood.

Rainfall was relatively light in the headwaters of the Dan and Roanoke Rivers but was heavy over the Banister River and in the Randolph area. Stages in the Banister River exceeded the 1940 flood by about 3 feet and stages were high in the Roanoke River below Randolph, reaching a crest of 32.6 feet at Randolph, 12 feet above flood stage, and 48.6 feet at Weldon, N. C., 18 feet above flood stage. These crests were well below the 1940 flood.

A third storm, on September 29, with as much as 4 inches of rain in southern Virginia and in North Carolina produced another rise in the Roanoke River basin. Stages were high in the Dan River but the Roanoke River did not rise particularly high this time.

East Gulf of Mexico drainage.—Minor flooding near the middle of the month in the Conecuh and Choctawhatchee Rivers resulted from heavy rains on September 10, averaging 4.25 inches over that area. Crest stages of near 1 foot above flood stage occurred in the Conecuh River at River Falls, Ala., and in the Choctawhatchee River at Caryville, Fla. Damage resulting from the flooding was negligible, but excessive rains, amounting to 10.15 inches in 24 hours at River Falls, caused considerable damage to crops, roads, and highways.

Missouri River basin.—Light overflows during the month were confined to the Floyd and Little Blue Rivers where flood stage was exceeded by about 1 foot at James, Iowa, and Endicott, Nebr., respectively. The Blue, Solomon, and Kansas Rivers which overflowed in the latter part of August receded to below bankful early in September.

Ohio River basin.—Drought conditions continued in a narrow region extending from West Virginia to northern Indiana where streamflow averaged less than 30 percent of normal and at some stations stages reached the minimum of record. The Scioto River at Chillicothe, Ohio, fell to 0.8 foot during the month, the lowest stage of record since the beginning of observations in 1910.

In Kentucky and Tennessee, drought conditions which had prevailed during most of the spring and summer months were relieved by two periods of excessive precipitation, August 31 to September 1, and September 28 to 29. The second storm was general over most of both States and in the vicinity of Knoxville, Tenn., was especially intense. At Arlington, a few miles northwest of Knoxville, 8.57 inches of rainfall occurred in approximately 24 hours. Flooding from small streams and creeks

615942—44——2

was extensive in Knoxville and vicinity, and Caney Creek above Rock Island, Tenn., and Stone River near Murfreesboro, Tenn., were in high flood.

Arkansas River basin.—On September 27–28 heavy rains occurred in the entire Neosho Basin, the Verdigris River above Independence, Kans., and in the Caney and Bird Creek Basins. Storm totals reached as high as 5 inches in the Neosho Basin below Iola, Kans., and about 4 inches in the Verdigris Basin. Runoff was relatively low and the resulting crests were generally below flood stages except in the Neosho River at Parsons and Oswego, Kans., where crests slightly above flood stage occurred on September 29.

West Gulf of Mexico drainage.—The severe flooding which began in the upper Nueces River during the latter part of August and reported in the August issue of the REVIEW continued in the lower portion during the first week of September. A crest of 26.65 feet, 11.5 feet above flood stage and the third highest stage of record, passed Cotulla, Tex., on August 30. The rise reached Three Rivers, Tex., on September 6 with a stage of 1.5 feet above flood stage.

Two additional rises in the lower Rio Grande followed the light to moderate overflows during the period August 24 to September 5. The first of these rises, from September 10 to 15, was caused by heavy rains over the San Juan River watershed in Mexico combined with high water present in the lower Rio Grande from the previous flood. The resulting crests were slightly lower than the earlier flood except at Brownsville, Tex., where a crest of 18.4 feet occurred on September 15, compared to 18.0 feet on September 5.

The second rise, from September 18 to 22, was caused by water coming down the main river from the El Paso, Tex., area. Flood stage was not reached from this rise except at Mercedes, Tex., with a crest of 21.8 feet. Very little damage resulted from these rises.

Colorado River basin.—A series of small but locally intense thunderstorms occurred in the vicinity of Thatcher and Safford, Ariz., during the period September 23–26, causing extensive damage to canal systems, highways, crops, and miscellaneous property in that area. The heaviest rains occurred on September 25 and rainfall totals for the entire storm period range from 4.69 inches at Hawk Hollow on the Fry Mesa Road at the foot of the Mesa, to as much as 7.65 inches in Thatcher. The Gila River, into which this area drains, showed no appreciable rise. Damage to property and crops resulting from the storms has been estimated at $700,000, crop damage from hail accounting for $125,000 of this loss.

FLOOD-STAGE REPORT FOR SEPTEMBER 1944

[All dates in September unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest [1]	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE					
James:	*Feet*			*Feet*	
Scottsville, Va.	20	19	20	26.0	19
Bremo Bluff, Va.	19	19	20	34.5	19
Columbia, Va.	10	18	21	37.4	20
Cartersville, Va.	16			29.6	20
State Farm, Va.	12	19	21	26.4	20
Richmond, Va.	8	19	22	22.4	21
Dan:					
Danville, Va.	11	19	19	12.8	19
		30	(2)		
Clarksville, Va.	13	20	22	18.5	21
Roanoke:					
Randolph, Va.	21	19	22	32.6	20
Weldon, N. C.	31	20	25	48.6	22
Williamston, N. C.	10	25	Oct. 13	12.9	27
Neuse:					
Neuse, N. C.	14	21	24	16.0	22
		30	(2)		
Smithfield, N. C.	13	23	25	13.8	24
Haw: Moncure, N. C.	20	30	(2)		
Catawba: Catawba, N. C.	8	30	(2)		
EAST GULF OF MEXICO DRAINAGE					
Choctawhatchee: Caryville, Fla.	12	13	16	12.8	14
Conecuh: River Falls, Ala.	35	11	11	35.7	11
MISSISSIPPI SYSTEM					
Missouri Basin					
Floyd: James, Iowa	14	20	21	15.1	21
Solomon: Beloit, Kans.	18	Aug. 31	1	21.2	1
Little Blue:					
Endicott, Nebr.	11	Aug. 30	1	12.4	1
		21	21	12.3	21
Hanover, Kans.	14	Aug. 30	1	16.6	Aug. 30
Big Blue:					
Blue Rapids, Kans.	20	Aug. 30	1	25.0	Aug. 31
Randolph, Kans.	22	Aug. 30	1	23.7	Aug. 31
Kansas: Manhattan, Kans.	17	Aug. 31	1	17.9	Aug. 31
Missouri: St. Charles, Mo.	25	Aug. 30	1	26.25	Aug. 31
Arkansas Basin					
Neosho:					
Parsons, Kans.	22	29	29	22.6	29
Oswego, Kans.	17	29	30	18.2	29
WEST GULF OF MEXICO DRAINAGE					
Nueces:					
Cotulla, Tex.	15	Aug. 29	7	28.65	Aug. 30
Three Rivers, Tex.	37	6	7	38.5	6
Rio Grande:					
Rio Grande City, Tex.	21	Aug. 29	1	26.6	Aug. 30
Hidalgo, Tex.	21	Aug. 29	4	23.4	2-3
		10	13	22.3	12
Mercedes, Tex.	21	Aug. 25	6	23.4	2, 4–5
		10	15	23.2	13
		21	22	21.8	21
Brownsville, Tex.	18	5	5	18.0	5
		14	15	18.4	15

[1] Provisional.
[2] Continued at end of month.

CLIMATOLOGICAL DATA

CONDENSED CLIMATOLOGICAL SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS

[For description of tables and charts, see REVIEW, January 1943, p. 15]

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Section	Temperature								Precipitation					
			Monthly extremes								Greatest monthly		Least monthly	
	Section average	Departure from the normal	Station	Highest	Date	Station	Lowest	Date	Section average	Departure from the normal	Station	Amount	Station	Amount
	°F.	°F.		°F.			°F.		In.	In.		In.		In.
Alabama	76.5	+.8	Wetumpka	103	[1]3	Valley Head	48	9	4.79	+1.45	Andalusia	12.87	Cahaba	1.24
Arizona	73.4	+.6	Mohawk	113	[1]5	Fort Valley	25	20	1.54	+.20	Safford Evaporation	3.85	5 stations	.00
Arkansas	73.8	−.5	2 stations	103	21	Mount Ida	42	9	1.84	−1.45	Osceola	4.61	2 stations	T
California	69.4	+1.7	Greenland Ranch	118	8	Boca	21	18	.08	−.36	Orleans	.93	137 stations	.00
Colorado	58.9	+.8	Las Animas	102	22	Fraser	10	16	.42	−.95	Rico	3.19	14 stations	.00
Florida	81.1	+1.7	3 stations	100	[1]3	3 stations	58	15	6.04	−.60	Niceville	17.84	Lakeland Airport	1.00
Georgia	75.8	+.4	2 stations	103	4	Blairsville	44	9	4.40	+.80	Brunswick Airport	13.78	Warrenton	1.11
Idaho	58.6	+1.5	Lewiston	108	6	Sun Valley	12	[1]18	.97	−.09	Wallace	4.06	Malad	T
Illinois	68.0	+.2	4 stations	97	[1]3	Joliet Airport	36	24	2.98	−.65	Quincy	7.02	Galatia	.60
Indiana	67.0	−.2	New Harmony	97	4	Winamac	32	24	2.44	−.83	Leavenworth	5.99	Monticello	.88
Iowa	64.3	+.4	Fairfield	94	3	Sioux Rapids	31	24	2.25	−1.53	Inwood (near)	4.12	Mapleton (near)	.20
Kansas	69.2	−.5	Lakin	103	2	Oberlin	29	24	1.92	−.89	Coffeyville	7.89	Long Island	.06
Kentucky	68.8	−1.6	3 stations	96	[1]2	Shelbyville	38	25	3.88	+.98	Willow	7.47	Uniontown	1.40
Louisiana	78.4	+.6	2 stations	100	[1]21	Tallulah	51	19	4.02	−.01	Paradis	11.29	St. Joseph	.42
Maryland-Delaware	68.2	+.6	Bridgeville, Del	96	4	Oakland, Md	32	26	4.91	+1.59	Snow Hill, Md	9.07	Hancock, Md	2.40
Michigan	60.8	+.4	2 stations	95	3	Watersmeet	23	[1]8	3.74	+.57	Gaylord	7.27	Mount Clemens	1.14
Minnesota	58.4	−.7	do	91	17	2 stations	27	[1]23	2.02	−.81	Ah-gwah-ching	5.77	Cambridge	.63
Mississippi	76.6	+.7	do	99	[1]3	Edinburg	47	9	3.13	+.05	Merrill	8.47	Pelahatchee	.27
Missouri	69.1	−.2	Doniphan	100	4	Black (near)	36	8	2.82	−1.16	Monroe City	6.03	Alton (near)	.64
Montana	56.8	+1.5	Flatwillow	100	7	King's Hill	13	30	1.18	−.07	Mystic Lake	3.57	Winnett	T
Nebraska	63.8	−.6	Chadron	95	14	Broken Bow	26	25	.85	−1.20	Pawnee City	5.12	6 stations	.00
Nevada	64.7	+3.3	Overton	111	8	Jarbridge	18	19	.19	−.23	Golliher Pasture	2.70	28 stations	.00
New England	61.3	+1.1	Norwalk, Conn	93	2	Lake Frontiere, Maine	20	[1]24	6.23	+2.43	Bridgeport, Conn	12.38	Nantucket, Mass	2.67
New Jersey	66.8	+1.0	Flemington	99	2	Charlotteburg	28	25	7.93	+4.14	New Brunswick	12.63	Sussex	4.63
New Mexico	64.0	−.4	2 stations	100	[1]2	Eagle Nest	18	21	1.82	+.5	Kingston	5.80	Chacon	T
New York	62.3	+1.1	Port Jervis	95	2	Alfred	23	24	4.70	+1.23	Scarsdale	12.84	Burdett	1.19
North Carolina	71.7	+.7	Monroe	102	3	2 stations	36	[1]9	7.05	+3.10	Roxboro	13.45	Southport	2.34
North Dakota	56.4	−.4	Center	91	8	2 stations	21	30	1.46	−.08	Steele	3.34	2 stations	.11
Ohio	65.0	−.6	Napoleon	96	3	Warren	26	24	1.92	−.99	Mansfield	5.16	Catawba Island	.56
Oklahoma	73.3	−.9	Crescent	110	21	Kenton	37	29	2.74	−.39	Nowata	7.74	2 stations	.06
Oregon	60.0	+2.1	Oakridge	107	5	Chemult	11	15	1.12	−.06	Headworks	6.89	Owyhee Dam	.00
Pennsylvania	63.5	−.6	Pheonixville	100	2	Kane	23	24	3.83	+.43	George School	8.07	McKeesport	1.08
South Carolina	75.4	+1.0	Walterboro	104	1	3 stations	48	[1]9	3.66	−.31	Landrum	7.90	Newberry	.94
South Dakota	60.6	−1.0	Wood	98	8	Custer	25	16	.92	−.58	Centerville	4.08	3 stations	T
Tennessee	71.6	+.2	Etowah	99	3	Rugby	38	9	7.08	+4.02	Clinton	16.47	Jacks Creek	2.55
Texas	76.0	−1.3	Throckmorton	105	21	2 stations	40	20	2.71	−.28	Freeport	16.14	Gainesville	.23
Utah	62.3	+1.5	Zion National Park	103	8	Morgan	18	16	.31	−.71	Bluff	1.62	23 stations	.00
Virginia	68.6	.0	2 stations	100	[1]3	Burkes Garden	32	9	7.84	+4.69	Randolph	19.45	Glen Lyn	1.85
Washington	61.8	+3.1	Mottinger	107	7	2 stations	25	[1]17	2.32	+.57	Snoqualmie Pass	10.46	Kennewick	.02
West Virginia	65.0	−1.3	McNeill	96	4	Cranberry Glades	26	9	4.19	+1.29	Glenville	9.44	2 stations	1.39
Wisconsin	60.9	+.6	Kenosha	95	3	Laona	25	23	3.06	−.62	Clam Lake	6.75	New London	1.00
Wyoming	55.4	+.6	3 stations	95	[1]1	Big Piney	12	16	.82	−.32	Lamar Ranger Station	3.43	3 stations	.00
Alaska (August)	52.4	−.4	Eklutna	85	17	Barrow	24	24	5.23	+1.73	Whittier	18.92	Barrow	1.31
Hawaii	74.2	−.4	Waianae	95	12	Haleakala	39	6	2.82	−2.98	Makahonaloa No. 2	16.21	16 stations	.00
Puerto Rico	78.4	−.4	Guayama	98	21	Guineo Reservoir	57	15	10.36	+1.89	Toro Negro	22.67	Canomanas	3.68

[1] Other dates also.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Mean	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Total degree days	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Greatest in 24 hours	Precipitation: Days with 0.01 inch or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
	Ft.	Ft.	Ft.	Mbs.	Mbs.	Mbs.	°F.	°F.	°F		°F	°F		°F	°F		°F.	%	In.	In.	In.		Mi.								0–10	In.	In.	
New England							**62.5**	**+2.0**										**83**	**6.43**	**+3.3**											**6.0**			
Eastport	78	67	85	1,013.5	1,016.6	−0.3	57.7	+1.9	78	15	64	40	24	51	21	223	51	84	7.65	+4.9	1.86	15	8.0	s.	39	e.	15	9	7	14	6.1	0.0	0.0	2
Greenville, Maine	1,070	6	41	977.7	1,017.3	.....	55.0	−.2	77	20	66	26	24	44	35	301	50	...	5.11	+1.4	1.81	16	...	s.	...	...	...	6	9	15	.....	.0	.0	3
Portland, Maine [1]	103	5	43	1,012.5	1,016.9	−.7	59.5	−.1	85	15	69	31	25	50	31	192	54	90	6.79	+3.7	3.59	13	7.7	s.	40	ne.	15	11	10	9	5.4	.0	.0	3
Concord [1]	289	5	45	1,006.4	1,017.3	−.7	60.6	+2.6	88	2	72	30	24	49	39	169	53	82	7.11	+3.7	4.00	10	6.9	nw.	41	ne.	15	5	13	12	6.5	.0	.0	4
Burlington [1]	403	5	51	1,001.0	1,016.3	−1.7	60.8	+.5	85	2	70	33	30	51	36	173	54	82	3.85	+.4	1.41	12	8.0	s.	27	s.	28	4	11	15	6.8	.0	.0	3
Boston [1]	124	33	62	1,012.2	1,017.3	−1.0	65.0	+1.8	90	2	73	42	24	57	24	90	56	77	5.36	+2.2	2.59	12	10.1	nw.	60	ne.	14	8	8	14	6.3	.0	.0	4
Nantucket	12	11	59	1,016.6	1,017.3	−1.3	65.6	+2.8	82	3	72	47	26	59	19	60	59	86	2.67	+.2	1.25	12	10.9	sw.	57	sw.	14	8	10	12	5.8	.0	.0	3
Block Island	26	11	46	1,015.9	1,016.9	−1.7	65.4	+2.0	81	3	71	48	25	60	16	55	60	85	3.66	+1.0	1.55	12	13.8	sw.	82	se.	14	13	6	11	5.0	.0	.0	5
Providence [2]	159	46	60	1,011.5	1,017.6	−.7	66.8	+3.6	90	2	76	39	25	58	28	61	56	82	9.74	+6.6	5.70	12	7.3	n.	43	se.	14	4	15	11	6.4	.0	.0	4
Hartford [1]	159	5	44	1,011.2	1,017.3	−1.0	65.0	+3.3	91	2	76	38	25	54	32	87	56	82	8.79	+5.3	4.40	11	7.3	s.	50	n.	14	5	13	12	6.2	.0	.0	3
New Haven [1]	107	5	39	1,012.9	1,017.3	−1.0	65.6	+3.8	85	3	74	40	25	57	26	76	56	78	9.99	+6.8	4.02	12	7.1	ne.	33	n.	14	11	7	12	5.6	.0	.0	3
Middle Atlantic							**68.6**	**+1.6**										**79**	**6.61**	**+2.9**											**6.2**			
Albany [1]	97	26	40	1,012.5	1,016.9	−1.4	63.0	+1.8	89	2	73	33	24	53	41	127	54	82	3.70	+.9	1.64	12	7.3	s.	30	nw.	2	7	10	13	6.3	.0	.0	5
Binghamton [2]	871	60	79	985.4	1,017.3	−1.0	63.0	+1.7	89	2	73	32	24	53	37	122	54	86	4.27	+1.2	3.24	8	5.5	w.	19	sw.	7	8	8	14	6.3	.0	.0	4
New York	314	415	454	1,005.1	1,016.6	−2.0	68.3	+1.5	90	2	75	51	26	62	22	35	58	74	8.61	+5.2	3.47	7	12.4	e.	81	n.	14	11	7	12	5.6	.0	.0	4
Harrisburg [1]	374	30	49	1,003.4	1,017.6	−1.0	67.0	+1.2	93	2	76	42	24	58	32	59	58	78	3.94	+.9	1.69	11	6.8	se.	21	nw.	7	10	6	14	6.1	.0	.0	4
Philadelphia [1]	114	6	56	1,012.9	1,017.3	−1.3	68.6	+2.7	93	2	78	45	25	60	29	47	59	78	5.82	+2.7	2.80	12	8.1	sw.	32	n.	14	6	10	14	6.6	.0	.0	3
Reading	323	47	306	1,005.1	1,016.9	.....	67.6	+1.0	91	2	76	45	25	59	31	50	.....	.....	5.61	+2.4	2.13	12	9.3	nw.	38	nw.	14	9	8	13	6.1	.0	.0	4
Scranton	805	72	104	988.8	1,018.0	−.3	64.2	+1.3	89	2	74	37	24	55	36	108	.....	.....	3.41	+.2	1.55	9	5.8	n.	18	nw.	14	8	11	11	6.0	.0	.0	3
Atlantic City	52	37	172	1,014.6	1,016.9	−1.4	68.7	+1.9	91	5	74	53	25	63	20	31	62	82	5.76	+3.1	2.86	13	15.0	e.	82	n.	14	8	8	14	6.5	.0	.0	3
Trenton	190	89	107	1,010.2	1,017.3	.....	67.8	+.9	91	3	76	44	25	60	25	49	58	76	7.60	+4.2	3.09	8	8.0	n.	49	n.	14	8	9	13	5.9	.0	.0	3
Baltimore [2]	123	100	215	1,012.5	1,017.3	−1.3	70.6	+2.1	93	4	78	53	24	64	24	27	60	76	5.39	+2.0	3.24	13	9.0	sw.	28	ne.	14	11	6	13	5.9	.0	.0	4
Washington [2]	112	56	100	1,013.5	1,017.3	−1.3	70.5	+2.4	92	4	78	53	26	63	25	24	60	78	5.77	+2.5	2.57	12	6.1	w.	35	w.	21	10	7	13	6.0	.0	.0	4
Cape Henry	18	8	54	1,015.6	1,016.6	.....	74.0	+2.2	91	1	80	55	26	68	22	1	66	81	6.12	+3.3	3.01	9	11.4	ne.	85	nw.	14	5	14	11	6.5	.0	.0	2
Lynchburg	686	144	184	992.6	1,017.6	−1.0	69.2	+.2	94	3	78	49	9	60	30	37	58	77	10.87	+7.6	5.85	12	7.7	n.	25	s.	1	5	12	13	6.4	.0	.0	2
Norfolk [2]	91	80	125	1,013.5	1,017.3	−.7	74.0	+2.4	95	4	80	56	26	68	23	5	64	81	9.61	+6.4	4.36	12	9.0	ne.	56	nw.	14	6	9	15	6.8	.0	.0	2
Richmond	144	11	52	1,011.5	1,016.6	−1.7	71.8	+1.3	93	3	80	51	26	63	28	16	62	80	3.74	+.5	1.23	12	7.0	ne.	25	nw.	14	7	10	13	6.0	.0	.0	3
South Atlantic							**75.7**	**+2.4**										**83**	**5.13**	**+0.9**											**6.1**			
Asheville	2,253	77	92	939.4	1,017.3	−1.0	68.2	+3.2	90	1	78	47	9	58	29	26	58	82	3.42	+.4	2.09	13	6.3	nw.	21	nw.	21	6	10	14	6.6	.0	.0	4
Charlotte [2]	779	63	86	988.8	1,016.6	−1.7	73.3	+1.8	97	3	82	55	25	65	25	8	62	78	6.30	+3.3	2.03	11	6.0	ne.	24	ne.	20	2	16	12	7.1	.0	.0	4
Greensboro [1]	886	6	56	985.8	1,017.6	.....	70.4	.....	93	3	80	49	9	61	31	24	62	84	7.14	.....	3.83	12	7.2	ne.	26	ne.	30	4	11	15	7.0	.0	.0	2
Hatteras	11	5	50	1,014.9	1,015.2	−2.8	76.0	+1.5	89	3	81	56	26	71	20	1	70	88	11.89	+7.3	3.77	12	11.0	ne.	90	w.	14	10	5	15	6.3	.0	.0	5
Raleigh [1]	376	5	69	1,003.4	1,017.3	−1.0	73.0	+2.5	97	3	82	52	26	64	27	7	64	84	7.42	+3.8	5.21	13	8.2	ne.	30	sw.	29	7	11	12	6.2	.0	.0	5
Wilmington	72	73	107	1,013.5	1,016.3	−1.3	76.2	+3.1	96	3	84	57	25	68	21	0	68	84	2.51	−2.0	.80	12	8.1	ne.	27	nw.	14	8	11	11	5.7	.0	.0	5
Charleston [2]	48	11	92	1,013.9	1,015.9	−1.4	78.5	+1.9	100	4	86	61	25	71	23	0	69	87	4.95	+.4	1.57	9	9.9	ne.	28	ne.	17	11	11	8	5.5	.0	.0	2
Columbia, S. C. [2]	347	70	91	1,003.7	1,016.6	−1.0	76.3	+1.8	100	3	85	59	25	68	27	0	66	80	3.42	.0	1.05	11	7.1	ne.	32	nw.	6	9	9	12	6.0	.0	.0	3
Greenville, S. C. [1]	1,040	18	36	980.0	1,016.6	.....	73.0	+2.4	97	3	82	53	25	64	27	11	63	78	4.61	+.9	1.47	9	7.9	ne.	23	ne.	8	8	12	10	6.0	.0	.0	3
Augusta [2]	182	62	77	1,009.5	1,016.3	−1.3	77.3	+2.0	99	5	86	60	25	68	25	0	66	77	1.79	−1.6	.68	10	5.1	ne.	19	w.	29	8	12	10	5.8	.0	.0	2
Savannah [2]	65	73	152	1,013.2	1,015.6	−1.3	79.8	+3.6	101	4	88	64	25	71	25	0	70	88	4.56	−.8	1.62	13	9.2	n.	28	n.	6	10	11	9	5.4	.0	.0	5
Jacksonville [2]	43	86	110	1,014.2	1,015.9	.0	80.9	+2.6	98	5	89	68	15	73	21	0	72	84	5.61	−1.7	1.67	14	7.2	e.	26	sw.	1	6	17	7	5.2	.0	.0	5
Florida Peninsula							**82.8**	**+1.8**										**80**	**3.29**	**−4.0**											**5.3**			
Key West [2]	21	10	64	1,012.9	1,013.9	.0	84.2	+2.0	91	11	89	73	25	80	15	0	74	76	4.60	−2.1	1.49	14	8.5	e.	26	e.	26	7	17	6	5.3	.0	.0	5
Miami [2]	25	242	249	1,013.2	1,014.6	−.3	81.1	+.2	90	13	85	71	25	77	14	0	74	84	2.88	−5.8	.77	15	11.8	se.	33	se.	17	8	20	2	4.6	.0	.0	10
Tampa [1]	35	6	43	1,013.5	1,015.2	+.3	83.1	+3.2	94	1	91	71	27	75	19	0	73	80	2.38	−4.0	.45	12	8.6	e.	26	e.	26	2	24	4	6.0	.0	.0	14
East Gulf							**77.5**	**+1.5**										**82**	**5.70**	**+1.4**											**5.2**			
Atlanta [1]	1,173	33	72	974.9	1,015.6	−2.0	73.5	+.7	95	5	82	57	9	65	23	4	64	78	3.45	+.4	2.08	11	9.3	nw.	29	s.	28	9	8	13	6.2	.0	.0	3
Macon [2]	370	79	87	1,002.4	1,015.9	−1.0	76.3	+1.5	98	5	86	59	15	67	26	0	67	82	5.99	+2.8	2.09	10	6.2	e.	21	s.	29	11	8	11	5.4	.0	.0	5
Thomasville	273	49	58	1,006.8	1,016.6	+.3	78.8	+2.0	98	4	88	62	14	70	25	0	.....	.....	7.53	+2.6	1.56	14	...	...	...	...	...	1	14	15	.....	.0	.0	8
Apalachicola	35	11	51	1,013.5	1,014.9	.....	80.5	+2.0	95	4	86	66	14	75	19	0	72	82	7.56	−.5	2.46	13	7.9	e.	26	e.	26	8	12	10	5.7	.0	.0	13
Pensacola	56	54	79	1,012.9	1,014.9	−.7	79.6	+1.6	94	3	87	65	14	73	22	0	71	84	11.41	+6.1	6.77	11	7.2	e.	40	s.	10	12	12	6	4.5	.0	.0	5
Anniston	741	9	...	...	...	...	73.9	−.2	94	5	83	54	23	65	30	0	.....	.....	2.69	−1.0	.81	11	...	se.	...	...	...	11	10	9	.....	.0	.0	5
Birmingham [1]	700	5	62	991.2	1,016.3	−.6	74.8	+1.6	95	3	85	54	23	64	32	0	64	78	2.22	.....	1.21	8	7.4	e.	26	e.	11	12	8	10	5.3	.0	.0	3
Mobile [2]	57	86	161	1,012.9	1,014.9	−1.0	79.4	+1.3	97	4	87	64	14	72	23	0	70	85	10.97	+6.0	7.04	14	7.0	e.	31	n.	21	10	10	10	5.1	.0	.0	8
Montgomery [2]	218	92	105	1,007.8	1,015.6	−1.0	77.7	+1.4	96	4	86	62	14	70	24	0	69	86	3.13	+.1	2.13	9	6.4	e.	21	sw.	29	12	7	11	5.5	.0	.0	2
Meridian [2]	375	67	92	1,002.0	1,015.6	−1.0	76.0	+1.5	96	3	86	57	13	66	30	0	67	82	1.74	−1.2	.85	7	4.9	e.	17	nw.	5	13	12	5	4.5	.0	.0	2
Vicksburg [2]	247	82	102	1,006.1	1,014.9	−1.7	78.0	+1.7	94	3	87	58	9	69	30	0	66	82	1.52	−1.4	1.12	5	7.2	n.	28	nw.	5	9	11	10	5.4	.0	.0	2
New Orleans [4]	53	50	84	1,012.5	1,014.2	−1.0	81.0	+2.8	95	4	88	69	14	4	20	0	71	78	6.67	+1.6	1.47	11	6.0	se.	24	ne.	22	12	10	8	4.7	.0	.0	5
West Gulf							**78.4**	**+0.7**										**75**	**3.03**	**−0.6**											**4.4**			
Shreveport [1]	249	5	64	1,005.8	1,014.6	−1.3	77.5	+1.6	97	21	88	58	9	68	29	0	67	78	1.22	−1.6	.46	6	7.0	ne.	25	se.	26	17	6	7	4.0	.0	.0	4
Fort Smith	463	57	82	998.3	1,014.2	−2.1	74.9	+.9	95	4	86	55	8	64	31	0	63	72	.39	−2.6	.20	5	6.3	e.	21	n.	4	16	8	6	4.3	.0	.0	0
Little Rock [1]	357	5	58	1,002.7	1,013.2	−1.7	75.7	+1.6	97	21	87	55	9	65	29	0	64	76	1.07	−2.1	.71	5	6.6	ne.	19	se.	27	15	8	7	4.5	.0	.0	0
Austin [1]	605	10	41	992.9	1,013.9	.....	77.6	−.7	96	22	88	59	10	67	28	0	64	71	4.66	+1.3	3.90	3	8.3	s.	26	se.	6	15	9	6	4.1	.0	.0	1
Brownsville [1]	57	5	54	1,009.8	1,011.9	.....	81.3	+.7	93	4	89	68	14	74	24	0	74	84	6.54	+.7	3.57	10	8.6	se.	32	ne.	25	6	16	8	5.7	.0	.0	2
Corpus Christi [1]	20	4	33	1,012.2	1,012.9	−1.3	80.2	+1.6	94	22	89	62	14	72	30	0	72	80	3.99	.....	3.38	4	9.1	se.	24	s.	27	18	6	6	3.9	.0	.0	2
Dallas [1]	512	5	45	996.3	1,014.2	.....	77.5	+.1	101	21	89	55	12	66	34	0	61	66	.67	−2.0	.52	7	8.9	s.	32	s.	26	17	6	7	4.0	.0	.0	2
Fort Worth [1]	679	35	56	990.5	1,014.2	−1.4	77.2	+1.3	98	21	88	58	25	67	30	0	60	62	.80	−1.7	.43	5	10.1	s.	30	nw.	5	17	6	7	3.8	.0	.0	1
Galveston [2]	54	106	114	1,011.5	1,013.5	−1.7	80.8	+.7	94	22	86	68	29	76	16	0	72	77	4.21	−1.4	2.68	8	9.5	s.	35	se.	27	16	7	7	4.1	.0	.0	5
Houston [2]	138	157	190	1,008.8	1,013.5	.....	80.6	+1.6	98	22	89	67	30	72	24	0	69	78	8.05	+4.0	4.32	5	8.9	se.	24	se.	27	9	14	7	5.0	.0	.0	4
Palestine	510	64	72	997.3	1,014.6	−1.0	77.2	+.2	97	21	87	60	9	68	27	0	64	70	1.11	−1.8	.41	4	6.4	s.	25	se.	26	18	6	6	3.7	.0	.0	1
Port Arthur	34	59	134	1,012.5	1,013.5	.....	80.3	+.8	94	22	88	67	14	73	21	0	70	84	6.29	+1.5	4.62	8	11.3	ne.	38	se.	27	14	9	7	4.6	.0	.0	6
San Antonio [1]	693	8	51	989.5	1,013.5	−1.1	78.0	−1.0	95	22	89	59	14	67	33	0	64	71	1.30	−1.8	.64	6	8.3	ne.	25	ne.	22	12	11	7	5.0	.0	.0	2

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS—Continued

District and station	Elevation of instruments: Barometer above sea level	Thermometer above ground	Anemometer above ground	Pressure: Station	Sea level	Departure from normal	Temperature of the air: Mean	Departure from normal	Maximum	Date	Mean maximum	Minimum	Date	Mean minimum	Greatest daily range	Total degree days	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Departure from normal	Greatest in 24 hours	Days with 0.01 inch or more	Wind: Average hourly velocity	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
	Ft.	Ft.	Ft.	Mbs.	Mbs.	Mbs.	°F.	°F.	°F		°F	°F		°F	°F		°F.	%	In.	In.	In.		Mi.								0–10	In.	In.	
Ohio Valley and Tennessee							68.5	+0.9										80	3.13	+0.2												5.1			
Chattanooga [1]	762	6	66	989.2	1,016.3	−1.7	73.2	+5.0	96	3	84	49	9	63	37	1	64	81	4.54	+1.4	2.45	9	6.0	s.	23	n.	5	7	11	12	5.8	.0	.0	5
Knoxville [1]	995	27	53	981.4	1,016.6	+.3	71.6	+2.2	92	2	81	51	9	62	29	1	62	81	8.61	+5.9	5.08	11	6.3	ne.	42	n.	2	7	15	8	5.5	.0	.0	5
Memphis [4]	399	5	86	1,001.4	1,015.2	−1.7	74.6	+2.7	93	21	85	53	9	65	31	0	64	77	3.43	+.6	2.57	8	6.3	e.	18	nw.	5	17	6	7	4.0	.0	.0	3
Nashville [1]	546	5	72	996.6	1,016.6	−1.4	72.3	+.5	93	4	82	50	9	62	33	1	62	80	4.40	+1.0	3.08	9	6.0	ne.	18	sw.	2	8	12	10	5.3	.0	.0	3
Lexington	980	6	----	982.1	1,018.3	.0	67.4	----	89	4	77	44	25	57	30	37	59	84	2.41	−.7	.83	8	----	ne.	----	----	----	13	7	10	4.9	.0	.0	3
Louisville [1]	525	106	120	998.0	1,016.9	−1.1	69.4	−1.1	91	4	78	49	26	60	27	16	59	80	4.94	+2.2	2.58	6	5.6	n.	34	ne.	4	14	10	6	4.5	.0	.0	2
Evansville [1]	431	11	40	1,001.0	1,016.3	−1.7	69.2	+1.5	93	4	81	43	25	58	36	21	58	76	2.14	−1.2	1.58	6	5.6	nw.	33	sw.	4	12	10	8	4.9	.0	.0	2
Indianapolis [1]	823	5	54	987.1	1,016.9	−1.1	66.0	+.6	92	3	77	41	25	55	33	61	56	79	2.31	----	.78	6	7.8	sw.	34	w.	4	13	9	8	5.0	.0	.0	3
Terre Haute [2]	575	68	149	995.9	1,016.9	----	68.6	−.2	91	3	79	44	24	58	31	35	58	70	1.38	−2.2	.91	8	7.5	s.	27	nw.	20	13	8	9	4.7	.0	.0	2
Cincinnati [2]	627	11	51	994.2	1,016.9	−1.4	67.9	+.8	92	3	79	41	25	56	34	41	58	84	1.21	−1.4	.67	6	5.1	sw.	23	nw.	4	11	12	7	4.9	.0	.0	3
Columbus [2]	822	90	110	987.5	1,017.3	−1.0	67.0	+.5	90	4	77	43	25	57	31	53	54	77	1.35	−1.2	.79	8	7.5	s.	23	sw.	4	11	10	9	4.7	.0	.0	3
Dayton [1]	1,003	6	55	981.0	1,017.3	----	66.6	+.7	90	3	77	44	25	56	30	54	54	72	.72	−2.2	.48	6	8.3	s.	42	w.	4	12	12	6	4.7	.0	.0	2
Elkins [2]	1,947	6	45	949.5	1,018.6	.0	61.6	−.3	83	4	73	37	9	50	40	139	53	93	3.15	.0	.56	15	5.1	se.	27	nw.	4	7	12	11	6.3	.0	.0	3
Parkersburg	637	77	84	994.2	1,017.6	−1.0	66.9	−.4	90	3	78	43	8	56	35	58	58	82	4.29	+1.5	1.17	12	5.0	se.	19	nw.	27	10	11	9	5.3	.0	.0	4
Pittsburgh [1]	842	39	54	986.8	1,017.3	−1.3	64.6	−.1	88	4	73	41	24	56	29	86	54	78	1.21	−1.4	.41	9	8.8	sw.	22	w.	7	8	14	8	5.5	.0	.0	2
Lower Lakes							63.8	+1.6										79	2.41	−0.6												5.6			
Buffalo [1]	768	34	96	988.8	1,016.9	−1.1	63.6	+2.0	84	20	73	35	24	54	32	119	54	80	3.63	+.7	1.08	8	11.0	s.	37	sw.	28	4	19	7	6.0	.0	.0	6
Canton	448	10	61	999.7	1,015.9	----	59.8	+1.0	83	1	70	30	30	50	33	202	52	82	3.02	−.3	.52	18	6.6	w.	29	w.	7	6	13	11	6.2	.0	.0	4
Oswego	335	71	85	1,003.7	1,016.3	−1.7	62.3	+1.1	84	20	70	39	30	55	26	133	55	80	3.21	+.5	.98	15	8.5	se.	27	w.	21	8	13	9	5.7	.0	.0	6
Rochester [1]	523	5	69	997.6	1,016.9	−1.1	62.6	+2.1	88	20	73	35	30	53	35	134	53	82	1.90	−.6	.60	16	8.0	sw.	35	w.	21	4	17	9	6.3	.0	.0	4
Syracuse [1]	596	5	57	994.9	1,016.6	−1.7	62.4	+2.1	85	2	72	33	30	53	37	135	55	84	2.18	−.5	.67	17	8.1	sw.	33	w.	28	5	10	15	6.7	.0	.0	4
Erie [2]	714	57	81	990.9	1,016.9	−1.1	65.1	+1.5	84	4	72	42	24	58	24	90	56	82	4.51	+1.1	2.69	9	7.3	s.	20	w.	21	4	19	7	6.0	.0	.0	6
Cleveland [1]	762	27	54	989.2	1,016.9	−1.1	65.0	+1.2	92	3	76	37	24	54	33	89	54	79	3.50	+.2	1.60	8	9.1	se.	33	n.	4	11	11	8	5.0	.0	.0	5
Sandusky	629	8	67	993.6	1,016.9	−1.1	66.2	+.9	91	2	76	42	25	56	31	71	----	----	1.30	−1.7	.46	6	8.0	sw.	25	nw.	6	8	17	5	5.1	.0	.0	3
Toledo [1]	628	5	47	993.9	1,017.3	−.7	64.4	+1.3	93	3	77	38	25	52	38	103	53	76	.69	−2.1	.25	5	9.3	sw.	33	nw.	6	14	12	4	4.0	.0	.0	2
Fort Wayne [1]	857	5	33	985.4	1,016.6	----	64.4	+1.3	91	3	76	38	24	53	39	101	53	74	1.24	−1.8	.61	5	6.6	sw.	26	nw.	6	12	10	8	4.9	.0	.0	1
Detroit [1]	730	5	78	990.2	1,016.6	−1.4	65.6	+3.2	91	2	76	40	24	55	29	91	54	73	1.33	−1.6	.92	5	8.6	sw.	28	nw.	21	9	15	6	5.2	.0	.0	3
Upper Lakes							60.3	+1.2										82	3.47	+0.2												6.3			
Alpena	609	5	89	993.6	1,015.9	−1.0	58.1	+.5	85	19	65	38	29	52	24	220	52	86	4.98	+2.0	1.25	18	9.8	nw.	27	nw.	7	5	11	14	6.8	.0	0	5
Escanaba	612	51	72	992.9	1,015.2	−1.1	58.2	+1.1	76	5	65	37	23	52	25	213	52	84	4.52	+1.2	1.38	16	10.4	s.	32	n.	6	4	9	17	7.3	.0	.0	9
Grand Rapids [2]	707	70	244	990.2	1,016.3	−1.3	65.2	+2.5	91	3	75	37	24	56	33	100	54	80	2.92	−.6	1.07	8	10.1	sw.	44	sw.	1	12	12	6	4.7	.0	.0	3
Lansing [2]	878	5	90	984.4	1,016.6	----	62.1	+.7	87	3	72	35	24	52	30	154	51	72	2.50	−.4	1.34	7	7.1	s.	22	nw.	21	16	7	7	4.3	.0	.0	4
Marquette	734	44	73	988.2	1,015.6	−.3	57.5	.0	84	18	64	41	22	51	20	244	51	84	3.34	+.1	1.01	17	7.9	n.	24	sw.	18	2	9	19	7.6	.0	.0	10
Sault Sainte Marie [1]	614	11	52	993.2	1,016.3	−.3	55.6	+1.6	76	18	63	34	23	48	28	283	51	92	5.38	+1.8	1.10	18	10.6	nw.	27	n.	6	1	9	20	7.7	.0	.0	5
Chicago [1]	673	5	36	991.5	1,015.9	−1.4	66.2	+1.3	93	3	76	39	24	56	29	77	54	74	1.56	−1.6	.54	7	8.2	s.	24	sw.	1	11	9	10	5.3	.0	.0	5
Green Bay	617	90	123	992.9	1,015.6	−1.0	61.0	+.6	83	18	68	42	8	53	25	163	54	82	3.99	+.5	2.28	11	9.6	s.	27	nw.	21	5	10	15	6.8	.0	.0	8
Milwaukee [1]	681	33	66	990.9	1,015.9	−1.0	63.6	+2.6	90	3	72	45	8	55	29	116	54	77	3.05	−.2	1.25	7	10.5	sw.	32	sw.	1	8	11	11	5.9	.0	.0	7
Duluth [2]	1,133	5	47	973.9	1,015.6	+.4	55.9	+.8	80	18	64	37	23	48	28	279	49	90	2.43	−.9	1.04	11	9.5	e.	26	e.	26	6	12	12	6.4	.0	.0	6
North Dakota							57.2	+0.2										74	1.36	−0.2												6.1			
Fargo [1]	940	5	43	980.0	1,014.2	−.4	58.1	−.1	84	17	68	37	23	48	34	216	50	82	1.40	−.8	.70	8	10.5	n.	29	n.	30	5	13	12	6.5	.0	.0	3
Bismarck [1]	1,677	5	43	954.6	1,014.6	+.7	57.4	+.1	83	8	69	36	30	46	38	233	46	72	1.34	+.1	.43	8	9.2	nw.	29	se.	29	7	12	11	5.8	.0	.0	4
Devils Lake	1,478	11	44	961.7	1,015.2	+1.3	55.9	.0	81	8	66	32	30	46	32	275	46	78	1.59	.0	1.16	10	7.8	n.	24	ne.	30	4	11	15	7.0	.0	.0	6
Grand Forks [1]	832	4	41	984.4	1,014.9	----	56.2	----	77	16	67	32	23	45	39	261	48	---	.65	----	.40	8	----	n.	----	----	----	2	10	18	----	.0	.0	2
Williston	1,878	42	50	947.5	1,014.2	+.7	57.2	+.6	85	7	70	27	30	44	40	239	42	63	1.10	.0	.57	7	6.1	se.	22	w.	20	11	10	9	5.0	.5	T	4
Upper Mississippi Valley							66.0	+1.0										80	2.68	−1.0												5.6			
Minneapolis-St. Paul [1]	919	43	74	981.0	1,014.2	−1.4	61.6	+.2	88	17	71	41	24	52	31	134	52	78	.97	−2.2	.69	7	9.4	se.	26	se.	17	9	9	12	5.7	.0	.0	3
Springfield, Minn.	1,025	4	42	977.7	1,014.6	----	61.8	----	91	17	72	39	29	51	34	127	52	78	1.64	----	.47	9	----	nw.	----	----	----	13	7	10	----	.0	.0	5
La Crosse [1]	714	5	29	988.8	1,014.6	−1.7	61.8	+.4	86	18	71	36	29	53	32	132	56	85	2.23	−1.8	1.25	8	6.7	s.	26	w.	21	8	8	14	6.3	.0	.0	7
Madison [2]	974	70	78	980.4	1,015.6	−1.3	63.5	+1.1	85	3	71	48	29	56	22	111	54	80	2.28	−1.4	.75	11	6.8	nw.	17	s.	9	10	9	11	5.8	.0	.0	6
Charles City	1,015	10	51	979.0	1,015.6	−.3	62.2	+1.2	86	3	72	39	29	52	31	132	----	----	1.64	−2.0	.28	11	5.1	s.	19	se.	17	10	10	10	5.3	.0	.0	6
Davenport [1]	606	6	50	993.6	1,016.3	−.6	66.2	+2.3	92	3	76	43	29	56	30	77	56	78	1.60	−2.0	.70	11	7.4	s.	37	s.	20	7	10	13	6.2	.0	.0	3
Des Moines [2]	860	5	99	983.7	1,014.9	−1.7	66.1	+.5	90	2	76	45	29	57	30	70	56	80	2.45	−1.2	1.09	8	7.8	sw.	25	sw.	9	8	11	11	5.7	.0	.0	5
Dubuque	699	60	79	990.2	1,015.6	−1.3	65.3	+1.3	87	3	74	45	29	57	29	93	55	80	3.20	−.8	1.50	10	4.8	s.	17	nw.	21	10	7	13	5.9	.0	.0	3
Burlington [1]	702	4	36	990.5	1,015.9	−1.0	66.2	−.2	92	3	77	44	7	56	32	70	58	81	3.24	−1.2	1.26	9	8.3	s.	34	nw.	20	10	8	12	5.8	.0	.0	5
Cairo	357	5	99	1,003.4	1,015.9	−1.7	72.4	−.1	95	4	82	53	8	63	26	0	----	----	1.86	−1.0	.60	7	6.1	s.	29	n.	4	9	10	11	5.6	.0	.0	3
Peoria [1]	609	6	26	994.2	1,016.6	−.7	66.2	+2.9	92	3	76	45	7	56	29	69	58	80	4.49	+.5	2.42	10	7.7	sw.	34	w.	20	8	19	3	4.6	.0	.0	5
Springfield, Ill. [2]	636	5	101	993.2	1,016.3	−1.3	69.2	+1.6	94	3	79	51	25	60	28	30	58	84	3.84	+.2	1.51	8	9.6	s.	34	n.	20	12	6	12	5.2	.0	.0	4
St. Louis [2]	568	35	308	995.6	1,016.3	−1.0	70.8	+.3	94	3	79	54	24	62	25	17	58	72	4.37	+.9	2.89	8	10.0	sw.	25	sw.	21	14	8	8	4.5	.0	.0	4
Missouri Valley							66.5	+0.3										75	2.12	−1.0												5.0			
Columbia, Mo. [2]	784	6	66	987.5	1,015.9	−1.0	68.8	−.6	93	3	79	50	7	59	30	32	58	78	5.67	+1.3	2.64	7	6.2	s.	18	nw.	10	13	10	7	4.6	.0	.0	7
Kansas City [1]	963	39	76	980.4	1,014.6	−2.0	70.4	+1.5	94	20	79	50	7	62	27	23	58	70	4.38	+.6	3.22	6	9.7	s.	28	sw.	1	11	7	12	5.5	.0	.0	3
St. Joseph [2]	967	11	49	980.0	1,014.6	----	68.8	+.4	92	20	79	48	29	59	30	36	58	76	.85	−3.1	.28	5	7.4	s.	20	e.	22	13	10	7	4.3	.0	.0	2
Springfield, Mo. [1]	1,324	5	67	969.2	1,015.9	−1.0	68.2	−.2	89	4	79	46	7	58	32	29	59	81	2.39	−1.1	1.36	7	8.9	s.	35	sw.	4	13	8	9	4.5	.0	.0	2
Topeka	987	65	87	979.7	1,014.6	----	70.5	+1.8	98	20	81	50	7	60	31	26	58	72	3.03	−.8	2.06	4	8.3	s.	24	sw.	1	9	11	10	5.4	.0	.0	3
Lincoln [2]	1,189	11	81	972.2	1,013.9	−1.7	67.2	+.8	89	2	77	42	29	57	31	57	55	76	.85	−2.1	.74	6	8.1	s.	37	w.	15	10	10	10	5.2	.0	.0	6
Omaha [1]	1,105	5	68	975.3	1,014.6	−1.3	66.6	+.9	89	2	76	43	29	57	34	62	56	76	.92	−2.3	.72	7	9.7	se.	29	se.	18	7	12	11	5.7	.0	.0	5
Valentine	2,598	46	54	923.8	1,014.6	.0	61.5	−1.0	93	8	76	36	30	47	45	144	44	62	.11	−1.2	.06	3	8.4	w.	27	s.	20	12	11	7	4.5	T	.0	1
Sioux City [1]	1,138	5	40	973.9	1,014.6	−.6	62.9	+.4	88	17	74	39	29	52	37	117	54	79	1.76	−1.3	1.12	9	8.5	s.	44	w.	15	11	8	11	5.2	.0	.0	5
Huron [1]	1,301	5	41	967.8	1,014.6	.0	60.5	−.8	73	91	17	47	6	47	38	158	52	80	1.21	−.4	.75	4	10.7	se.	29	se.	29	12	10	8	4.6	T	.0	3

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS—Continued

District and station	Elevation of instruments: Barometer above sea level	Thermometer above ground	Anemometer above ground	Pressure: Station	Sea level	Departure from normal	Temperature of the air: Mean	Departure from normal	Maximum	Date	Mean maximum	Minimum	Date	Mean minimum	Greatest daily range	Total degree days	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Departure from normal	Greatest in 24 hours	Days with 0.01 inch or more	Wind: Average hourly velocity	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
	Ft.	Ft.	Ft.	Mbs.	Mbs.	Mbs.	°F.	°F.	°F		°F	°F		°F	°F		°F.	%	In.	In.	In.		Mi.								0–10	In.	In.	
Northern Slope							58.8	+1.5										56	0.75	−0.5											4.5			
Billings [1]	3,570	16	40	891.6	1,014.2	----	59.3	−.9	90	7	72	30	30	46	39	192	38	50	2.01	----	1.54	5	9.8	sw.	35	nw.	14	12	11	7	4.8	T	.0	3
Havre	2,507	11	67	926.2	1,014.2	+.3	59.0	+2.6	92	7	73	27	30	45	44	197	39	54	.27	−1.0	.18	6	8.2	sw.	38	sw.	16	8	16	6	5.0	1.4	T	0
Helena [1]	4,124	5	43	874.7	1,015.6	+.7	56.2	+.8	88	7	71	27	18	42	42	268	40	58	.82	−.4	.59	5	7.4	w.	33	w.	16	13	5	12	4.9	.0	.0	1
Missoula [2]	3,205	80	91	903.2	1,016.3	----	59.3	+3.7	93	7	73	30	18	46	43	205	41	60	1.20	−.2	.52	6	6.4	e.	28	ne.	30	14	5	11	4.7	T	.0	1
Kalispell	2,973	48	56	912.0	1,014.2	−.4	56.5	+3.0	90	7	69	32	18	44	42	266	40	62	.75	−.5	.37	8	5.8	nw.	29	sw.	16	11	10	9	5.1	.0	.0	1
Miles City [1]	2,371	5	78	930.9	1,014.2	.0	60.4	----	91	7	74	30	30	46	41	158	41	57	.87	----	.51	6	----	nw.	----	----	----	10	10	10	5.3	T	.0	3
Rapid City [1]	3,259	5	63	902.1	1,014.6	.0	60.8	+.6	91	8	76	30	30	46	46	149	39	54	.40	−.8	.13	5	13.3	nw.	45	nw.	14	17	5	8	4.2	T	.0	3
Cheyenne [1]	6,094	8	40	814.8	1,013.5	−1.1	57.3	+.3	86	7	74	29	28	40	44	236	33	46	.18	−1.0	.10	5	9.6	w.	36	n.	27	14	12	4	3.8	.0	.0	4
Lander	5,352	60	68	836.4	1,014.6	.0	56.9	+1.2	86	7	73	28	30	41	46	249	36	53	2.32	+1.4	2.10	5	4.8	sw.	38	sw.	14	16	9	5	3.2	12.0	2.5	1
Sheridan [1]	3,700	5	38	884.9	1,014.9	----	58.4	+2.1	90	7	74	30	30	43	44	209	37	53	.66	−.6	.19	8	8.1	nw.	41	nw.	26	14	8	8	4.5	T	T	2
North Platte [2]	2,821	11	51	916.0	1,013.5	−1.4	64.1	+2.0	94	8	78	38	24	50	42	94	46	64	.13	−1.2	.07	4	6.8	n.	22	nw.	8	14	7	9	4.5	.0	.0	5
Middle Slope							68.7	−0.1										62	1.62	−0.6											4.3			
Denver [2]	5,292	106	113	838.8	1,013.2	−1.4	64.2	+1.3	92	1	78	42	28	50	39	82	36	44	T	−1.0	T	0	6.5	s.	30	ne.	4	18	10	2	3.4	.0	.0	0
Pueblo [1]	4,690	5	36	857.1	1,012.9	−1.7	65.0	+.4	94	1	82	37	29	48	48	68	38	46	.20	−.6	.18	3	7.5	nw.	30	sw.	1	19	6	5	3.5	.0	.0	2
Concordia	1,392	50	58	965.1	1,014.2	−1.4	67.8	−.5	91	2	78	42	29	58	30	46	56	70	1.39	−1.2	.72	8	7.2	s.	26	s.	15	11	8	11	5.2	.0	.0	7
Dodge City [1]	2,509	5	58	927.2	1,013.5	−1.7	67.7	−1.7	96	15	81	39	24	54	38	57	54	67	1.36	−.5	.59	8	14.6	s.	51	nw.	22	15	6	9	4.4	.0	.0	5
Wichita [1]	1,358	6	64	966.5	1,014.6	−1.3	70.4	−.2	98	20	81	49	25	60	33	30	56	68	2.20	−.9	2.08	6	13.5	s.	36	s.	2	16	4	10	4.8	.0	.0	4
Oklahoma City [1]	1,214	10	47	971.9	1,014.2	−1.4	73.6	+.8	97	20	84	50	25	63	30	10	58	67	2.20	−.8	.68	9	8.0	s.	23	n.	4	15	7	8	4.2	.0	.0	2
Tulsa [1]	674	10	60	990.9	1,014.6	----	72.0	−.9	95	4	83	52	25	60	33	10	60	73	3.96	+.9	1.54	4	9.6	s.	37	n.	4	11	11	8	4.8	.0	.0	2
Southern Slope							72.6	−0.1										67	1.98	−0.5											4.5			
Abilene [1]	1,738	4	41	953.9	1,013.9	−.7	74.2	+.4	94	21	86	52	25	63	33	0	60	68	1.03	−1.7	.71	4	10.8	s.	28	sw.	2	18	5	7	3.9	0	.0	1
Amarillo [1]	3,676	5	42	890.3	1,013.9	−.7	69.0	+1.2	96	20	82	44	28	56	38	35	52	64	2.08	−.2	1.55	6	14.2	s.	38	sw.	15	15	6	9	4.3	.0	.0	3
Del Rio	960	63	71	979.3	1,011.9	−2.0	78.4	−.8	94	22	87	63	25	70	23	0	66	70	3.94	+1.0	2.33	5	8.2	se.	22	e.	24	8	13	9	5.4	0	.0	2
Roswell	3,566	75	85	893.7	1,013.9	−.7	69.0	−1.3	94	2	82	48	12	56	41	19	54	65	.86	−1.2	.48	9	7.5	s.	24	e.	10	14	9	7	4.3	.0	.0	3
Southern Plateau							75.3	+1.4										48	0.76	−0.2											3.1			
El Paso [1]	3,778	30	85	885.9	1,010.5	−1.4	72.6	+.3	96	20	84	52	29	61	35	1	50	51	.25	−1.0	.14	4	9.6	e.	34	ne.	5	14	6	10	4.6	.0	.0	3
Albuquerque [1]	5,314	5	45	839.1	1,010.8	----	68.6	+.7	91	21	81	50	29	56	38	21	45	48	.65	−.2	.30	8	10.0	se.	40	e.	23	18	6	6	3.8	.0	.0	5
Flagstaff	6,907	26	51	792.8	1,014.6	----	60.4	+3.2	87	10	76	34	20	45	45	141	38	52	1.33	−.4	.48	5	----	nw.	----	----	----	----	----	----	----	.0	.0	7
Phoenix [1]	1,107	39	87	970.2	1,007.1	−2.4	83.9	+1.2	107	5	97	63	20	71	39	0	54	44	.07	−.7	.07	1	7.2	e.	28	se.	12	21	5	4	2.9	.0	.0	1
Tucson [1]	2,555	5	39	923.1	1,008.5	----	79.6	−.1	103	21	92	59	15	67	38	0	54	48	2.08	+.9	1.33	7	----	se.	----	----	----	21	5	4	3.0	.0	.0	8
Yuma	142	9	54	1,002.0	1,006.1	−2.4	86.8	+3.1	112	5	102	64	19	72	40	0	56	43	.21	−.1	.21	1	5.7	s.	18	n.	23	27	3	0	1.3	.0	.0	1
Middle Plateau							64.2	+2.6										37	0.16	−0.5											2.4			
Reno [1]	4,537	20	52	862.9	1,013.9	−.3	61.2	+3.2	97	10	83	31	18	39	55	149	34	48	.07	−.2	.07	2	5.9	n.	33	w.	21	25	3	2	2.2	.0	.0	1
Tonopah	6,090	9	20	815.1	1,011.5	----	66.7	+3.5	90	11	79	36	30	55	32	67	28	25	.00	−.4	.00	0	----	nw.	----	----	----	23	6	1	----	0	0	0
Winnemucca	4,339	5	56	868.3	1,014.2	+.7	61.4	+2.2	97	8	81	31	15	41	55	167	32	40	.35	−.1	.30	3	6.9	ne.	33	sw.	21	20	8	2	2.5	.0	.0	1
Modena	5,373	10	46	833.7	1,011.2	−2.0	62.6	+2.6	95	9	82	30	16	43	52	100	----	----	.02	−.8	.02	1	9.8	w.	32	nw.	30	26	4	0	1.8	.0	.0	0
Salt Lake City [1]	4,227	32	58	967.3	1,012.9	−1.3	63.8	+1.1	92	7	79	41	16	48	40	96	37	43	.52	−.5	.42	2	8.6	se.	33	s.	21	22	5	3	2.7	.0	.0	0
Grand Junction	4,602	60	68	858.8	1,011.5	−2.7	69.3	+3.1	92	8	84	46	16	54	36	6	34	31	T	−.9	T	0	6.4	se.	25	sw.	14	23	5	2	2.6	.0	.0	1
Northern Plateau							63.1	+3.0										49	0.45	−0.3											3.7			
Baker [2]	3,471	36	54	896.4	1,016.3	+.7	59.0	+3.0	96	7	76	28	19	42	47	221	34	55	.19	−.6	.07	5	5.9	s.	20	n.	30	18	7	5	3.3	.0	.0	2
Boise [1]	2,739	5	49	919.7	1,014.2	−.7	63.8	+2.6	96	6	78	35	19	50	37	130	39	45	.16	−.4	.09	2	8.6	nw.	29	nw.	14	19	8	6	3.3	.0	.0	0
Pocatello [1]	4,478	5	31	863.5	1,014.9	+.3	58.8	−.5	92	8	76	30	18	41	49	203	33	44	.25	−.5	.23	2	8.7	sw.	34	sw.	1	21	3	6	2.8	.0	.0	0
Spokane [1]	1,929	27	42	946.5	1,014.2	−1.0	61.6	+2.4	95	7	76	34	18	47	45	152	41	53	.56	−.3	.30	6	6.9	ne.	31	sw.	16	11	10	9	4.8	.0	.0	1
Walla Walla	991	57	65	979.0	1,013.9	−2.0	68.2	+4.4	99	7	81	41	18	56	36	65	----	----	.96	.0	.50	7	5.7	sw.	21	w.	13	16	9	5	3.6	.0	.0	0
Yakima	1,076	58	67	976.0	1,014.2	----	67.0	+5.9	98	8	81	38	19	53	39	79	----	----	.59	+.1	.56	4	5.6	nw.	25	nw.	16	13	11	6	4.2	.0	.0	1
North Pacific Coast							62.3	+3.6										72	2.03	−0.1											5.0			
North Head	211	5	55	1009.5	1016.6	−.3	57.4	+.9	78	4	62	47	18	53	26	224	54	91	2.70	+.3	1.00	15	12.1	n.	43	s.	21	7	6	17	6.8	.0	.0	0
Seattle [2]	125	90	321	1011.5	1015.9	−.4	63.1	+2.8	88	5	72	45	18	54	30	93	52	72	.65	−1.1	.20	8	8.1	s.	37	sw.	13	10	10	10	5.3	.0	.0	0
Tacoma	194	172	201	1009.1	1015.5	−1.0	61.4	+4.1	88	5	70	40	18	53	32	127	----	----	1.45	−.6	.61	8	7.7	n.	2	sw.	16	14	6	10	4.6	.0	.0	0
Tatoosh Island	86	9	61	1013.2	1015.9	−.4	54.8	+1.8	70	5	59	46	8	51	17	306	52	92	5.45	+.8	1.52	16	12.8	s.	4	s.	15	5	7	18	7.2	.0	.0	0
Medford [1]	1,329	29	58	968.2	1014.9	----	66.6	+3.0	103	5	85	38	15	48	52	76	42	50	.80	+.2	.80	2	----	nw.	----	----	----	18	3	9	3.2	.0	.0	1
Portland, Oreg. [2]	154	68	106	1010.5	1015.9	−1.0	66.6	+4.9	102	5	77	46	18	56	38	68	52	70	2.40	+.4	.84	9	6.1	nw.	19	w.	13	14	9	7	4.6	.0	.0	0
Roseburg	510	45	76	997.6	1015.6	−1.0	66.2	+3.3	104	5	82	41	19	51	49	73	48	60	.75	−.5	.35	4	3.6	n.	18	nw.	26	17	8	5	3.2	.0	.0	0
Middle Pacific Coast							67.1	+2.3										61	0.65	−0.5											3.3			
Eureka	60	72	88	1014.9	1016.6	+.3	54.6	−1.3	68	21	59	46	20	50	20	314	51	90	.19	−.8	.15	6	6.1	n.	30	n.	14	9	6	15	6.3	.0	.0	1
Red Bluff [1]	----	----	----	998.3	1010.2	----	78.4	+5.3	110	9	95	51	19	62	43	2	38	27	.00	----	.00	0	8.6	nw.	36	w.	29	26	2	2	1.9	.0	.0	0
Sacramento	66	92	115	1008.5	1010.2	−1.0	74.8	+5.5	108	9	91	49	18	58	39	3	48	47	T	−.4	T	0	6.5	s.	18	sw.	20	27	2	1	1.2	.0	.0	0
San Francisco [2]	155	112	132	1007.1	1012.2	−1.7	60.6	−.3	91	9	68	51	12	53	34	149	52	81	.00	−.4	.00	0	9.5	w.	26	w.	5	16	10	4	3.8	.0	.0	0
South Pacific Coast							70.4	+0.7										63	0.01	−0.2											3.6			
Fresno [1]	327	5	34	998.3	1009.1	−2.4	75.2	+3.2	107	10	92	49	19	58	40	1	48	44	.01	−.2	.01	1	5.5	nw.	20	nw.	30	28	2	0	1.2	.0	.0	0
Los Angeles	338	223	250	999.7	1011.2	−.7	69.2	+.2	101	23	79	53	21	60	37	5	56	69	.01	−.2	.01	1	5.7	w.	19	w.	8	16	10	4	4.0	.0	.0	0
San Diego [1]	87	20	55	1008.5	1011.2	−1.0	66.9	−1.3	84	7	73	53	22	60	25	6	58	76	T	−.1	T	0	6.7	s.	18	nw.	21	9	11	10	5.5	.0	.0	0
West Indies																																		
San Juan, P. R.	82	10	54	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Panama Canal																																		
Balboa Heights	118	6	92	----	[3]1,010.8	+.6	79.6	−.2	90	4	86	70	11	73	17	----	74	[3]87	6.08	−2.2	----	19	4.7	s.	19	nw.	9	1	16	13	7.1	0	0	4
Cristobal	27	47	97	----	[3]1,010.8	+.6	82.3	+1.2	92	12	88	74	19	76	17	----	75	[3]80	4.40	−8.2	----	19	5.8	s.	23	s.	21	0	17	13	7.3	0	0	14

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Mean	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Total degree days	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Greatest in 24 hours	Precipitation: Days with 0.01 inch or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month	Number of days with thunderstorms
	Ft.	*Ft.*	*Ft.*	*Mbs.*	*Mbs.*	*Mbs.*	°*F.*	°*F.*	°*F*		°*F*	°*F*		°*F*	°*F*		°*F.*	%	*In.*	*In.*	*In.*		*Mi.*								*0–10*	*In.*	*In.*	
Alaska																																		
Anchorage [1]	132	5	44	1,006.8	1,011.9	-----	47.0	−.8	69	8	55	26	2	39	31	544	40	76	2.50	−.1	.62	13	6.4	n.	35	s.	8	2	10	18	7.2	T	0	0
Fairbanks [1]	454	5	63	995.6	1,012.9	-----	42.1	−1.5	70	8	52	19	21	33	35	691	36	78	1.09	−.2	.47	12	6.6	sw.	28	w.	8	2	6	22	7.9	T	0	0
Juneau [1]	80	6	21	1,011.5	1,014.6	-----	50.2	-----	67	28	58	31	26	43	28	445	45	82	3.69	-----	.82	18	6.9	n.	30	se.	1	2	5	23	8.2	0	0	0
Nome	22	25	56	1,012.5	1,013.2	-----	40.2	−1.5	54	14	46	26	30	35	17	742	37	84	1.94	−.8	.55	15	9.0	nw.	34	s.	4	3	4	23	7.8	T	0	0
Bethel	28	7	31	1,012.5	1,013.9	-----	45.0	−.3	60	25	51	32	20	39	20	598	42	86	1.04	−2.1	.22	17	9.9	nw.	29	-----	18	2	8	20	7.8	T	0	0
Gambell	32	5	32	1,013.5	1,014.6	-----	40.0	−1.6	46	1	43	33	19	37	11	750	36	88	.98	−1.2	-----	16	14.0	sw.	-----	-----	-----	2	6	22	8.0	0	0	0
Ketchikan	75	69	90	1,013.2	1,014.2	-----	55.2	+1.4	73	9	62	42	24	49	22	295	48	78	11.95	−.2	2.99	14	6.4	nw.	23	e.	21	7	3	20	6.8	0	0	0
Kotzebue	20	5	31	1,012.2	1,012.9	-----	38.8	−1.9	49	17	43	25	30	35	13	783	36	86	2.34	+1.5	.48	18	-----	w.	-----	-----	-----	3	2	25	8.5	T	0	0
McGrath	331	5	31	1,000.3	1,013.2	-----	43.0	-----	59	17	50	24	21	36	24	658	38	80	2.11	−.3	1.13	17	-----	s.	-----	-----	-----	3	6	21	8.0	T	0	0
Northway	1,718	5	32	950.6	1,014.2	-----	41.3	-----	60	16	49	26	3	33	27	709	35	80	1.84	-----	.45	12	6.5	nnw.	29	-----	1	1	5	24	8.4	6.7	.5	0
Summit	2,405	5	30	926.5	1,014.2	-----	39.2	-----	60	16	46	23	21	32	25	774	34	81	3.75	-----	2.07	14	-----	ne.	-----	-----	-----	4	8	18	7.4	4.6	0	0
Hawaii																																		
Honolulu	38	86	100	1,014.9	1,015.6	-----	78.0	−.2	85	24	82	70	9	74	13	0	-----	-----	.33	−1.0	.20	9	9.3	e.	25	ne.	17	19	8	3	3.3	0	0	0

[1] Data are airport records.
[2] Barometric data (adjusted to old city elevation) and hygrometric data from airport; otherwise city office records.
[3] Observations taken hihourly.
[4] Pressure (adjusted to old city elevation), temperature, and hygrometric data from airport; otherwise city office records.
[5] Temperature and precipitation from city records, other data from airport.

Note.—Except as indicated by notes [1], [2], [4], and [5] data in table are city office records

SEVERE LOCAL STORMS, SEPTEMBER 1944

[Compiled by Mary O. Souder]

[The table herewith contains such data as has been received concerning severe local storms that occurred during the month. A revised list of tornadoes will appear in the United States Meteorological Yearbook]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Chautauqua, N. Y.	September 4	-----	-----	-----	-----	Electrical, wind, heavy rain, and hail.	2 barns struck by lightning and burned, many silos blown over, some buildings unroofed, trees broken and uprooted, power and communication lines broken, and crops blown over and beaten down. Traffic was interrupted by flooding and washouts and, in some localities cellars and buildings were flooded.
Carlisle, Pa., vicinity of	5	2 p. m.	-----	-----	-----	Wind, hail, and rain.	Wind tore part of roof from barn, trees and power lines down blocking roads; loss in crops from rain and hail; man stunned by lightning.
Oswego, N. Y., and vicinity	7	-----	-----	-----	-----	Wind	Thousands of bushels of fruit whipped from trees, the loss in Bartlett pears being especially heavy.
Glasgow, Ky	8	-----	-----	-----	-----	Hail	Fields of tobacco completely destroyed. Some hailstones reported to have been as large as hen eggs.
Mobile, Ala., and vicinity	9–10	-----	-----	-----	$15,000	Rain	9.50 to 11 inches of rain recorded. Streets in Mobile flooded to depths ranging from 6 to 18 inches, and, in the southern sections of the city, rainwater backed into the lower floors of some homes. Small boats were used in this section between 11 a. m., and 3 p. m. Many automobiles drowned out by heavy rain and high water. The bridge causeway was closed part of the afternoon of Sept., 10, when water to the depth of a foot washed over it. In the periods, 9:15 a. m. to 12:15 p. m., and 2 p. m. to 4:50 p. m., 4.50 inches of rain fell. There was about $10,000 damage in the city, and in the county, $5,000 damage.
United States, 900 miles of the east coast from Hatteras, N. C., northward.	14–15	-----	-----	390	100,000,000	Great Atlantic hurricane.	Damage approximated. For details see elsewhere in this issue of the Review.
Meredosia, Ill.	16	-----	-----	1	-----	Wind and hail	Barn and several small sheds demolished; 2 persons injured. Moderate crop loss on 25 acres from hail.
Clovis, N. Mex.	17	7 p. m.	88	0	25,000	Tornado	Property damaged.
Roanoke and James River Basins, Va.	18–22	-----	-----	2	1,225,000	Flood	Loss in crops in the Roanoke River Basin, $200,000. In the James River Basin including tributaries, crop loss amounted to $375,000 and tangible property loss, including railway washouts amounted to about $200,000. In addition 25 to 30 highway bridges were washed out with a loss of approximately $450,000. 2 lives lost in careless traveling through small-stream floodwaters.
Chester, S. C., vicinity of	21	-----	-----	-----	1,200	Electrical	Barn burned.
Altamont and Parsons, Kans., and vicinities.	27	About 9 p. m.	-----	0	73,250	Tornado	Storm apparently originated 4 miles south of Altamont. Practically all damage occurred at the Kansas Ordnance Plant about 3 miles east of Parsons, which was struck at 9:02 p. m. 5 storehouses completely wrecked, 1 production line put out of operation temporarily and trucks and automobiles demolished; path 15 miles long.
Bucks County, Pa.	28	5:30 p. m.	100	0	50,000	----do	Barns and chicken houses unroofed; trees blown down.

SOLAR RADIATION AND SUNSPOT DATA FOR SEPTEMBER 1944

[Solar Radiation Investigations Section, I. F. Hand, in charge]

SOLAR RADIATION OBSERVATIONS

EXPLANATIONS of the tables and references to descriptions of instruments, stations, and methods of observation, and to summaries of data, are given in the January 1944 REVIEW, page 43. A list of the pyrheliometric stations also is given on page 45 of the same REVIEW.

Beginning with this issue, values of illumination received on a horizontal surface in Boston will be included at the end of table 2. The spectral response of the receiver is very close to the visibility curve, which includes that portion between 0.3μ and 0.74μ. A modified photronic cell is used as the receiver. A slightly raised disk of milk glass not only diffuses the illumination, but also largely compensates for the partial failure of the cosine law. Owing to peculiarities of the functioning of the photronic cell under varying meteorological conditions, we do not believe that the values of illumination are as consistent as those of total solar and sky radiation. Nevertheless, they probably are sufficiently accurate for most practical purposes.

Values of normal-incidence radiation received at the Federal Building in Boston also appear for the first time in this issue. A Clark vacuum pyrheliometer in conjunction with an eye-read potentiometer is used for these measurements. Owing to the smoke pall which hangs over Boston during much of the time in the colder months, comparative readings made simultaneously in Boston and at Blue Hill Observatory, 10 miles to the south, should furnish excellent information relative to the depleting effect of city contamination. The percentage loss owing to this vitiation is indicated at the bottom of the Boston table in table 1.

TABLE 1.—*Solar radiation intensities during September 1944*

[Gram-calories per minute per square centimeter of normal surface]

MADISON, WIS.

Date	Sun's zenith distance: 7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass: A. M.				*1.0	P. M.				Local mean solar time
	e	5.0	4.0	3.0	2.0		2.0	3.0	4.0	5.0	e
	mb.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*
Sept. 2	17.7	0.52	0.69	0.80	0.99	1.12	------	------	------	------	19.6
Sept. 4	17.0	.70	.80	.88	1.04	1.26	------	------	------	------	17.0
Sept. 7	9.8	.66	.79	.92	1.08	1.30	------	------	------	------	8.7
Sept. 8	8.4	.65	.75	.81	1.10	1.27	------	------	------	------	20.4
Sept. 15	13.2	------	------	------	.77	1.06	------	------	------	------	13.7
Sept. 20	19.0	------	------	------	.80	------	------	------	------	------	21.8
Sept. 21	15.8	.80	.92	1.10	1.21	1.44	------	------	------	------	11.4
Sept. 22	9.8	.81	.92	1.02	1.22	------	------	------	------	------	9.4
Sept. 25	11.0	------	------	------	1.06	1.35	------	------	------	------	12.7
Sept. 26	12.7	.49	.61	.69	.83	1.32	------	------	------	------	15.3
Sept. 27	15.8	.32	.42	.60	.83	1.16	------	------	------	------	20.4
Means	------	.62	.74	.85	.99	1.25	------	------	------	------	------
Departures	------	−.11	−.13	−.15	−.15	−.13	------	------	------	------	------

TABLE 1.—*Solar radiation intensities during September 1944*—Con.

LINCOLN, NEBR.

Date	Sun's zenith distance: 7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass: A. M.				*1.0	P. M.				Local mean solar time
	e	5.0	4.0	3.0	2.0		2.0	3.0	4.0	5.0	e
	mb.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*
Sept. 1	12.3	------	------	0.90	1.09	1.41	------	------	------	------	16.4
Sept. 2	15.8	------	0.67	.84	1.01	1.27	0.94	0.71	0.56	0.43	18.3
Sept. 4	14.6	------	------	.94	1.11	1.35	------	------	------	------	16.4
Sept. 6	11.8	------	------	------	------	1.36	1.10	.97	.77	.67	9.8
Sept. 7	9.8	------	------	------	------	1.28	.97	.77	.62	.50	9.8
Sept. 8	11.8	------	------	------	------	1.31	.99	.79	.67	.56	14.6
Sept. 11	11.0	------	------	.72	.94	------	------	------	------	------	11.8
Sept. 14	15.3	------	------	------	------	1.44	.99	.77	.60	.47	14.2
Sept. 15	16.4	------	.64	.79	.97	1.24	.99	------	------	------	18.3
Sept. 16	16.9	------	------	------	------	1.37	1.06	.77	.64	.54	19.0
Sept. 19	16.9	------	------	------	.86	1.25	------	------	------	------	21.1
Sept. 21	13.7	0.90	.99	1.10	1.27	1.50	1.23	1.06	.92	.82	11.4
Sept. 28	11.0	------	------	------	------	1.45	1.27	1.11	.96	.85	10.6
Sept. 29	7.8	------	------	------	1.22	1.51	1.25	1.06	.92	.81	9.1
Means	------	(.90)	.77	.88	1.06	1.37	1.09	.89	.74	.63	------
Departures	------	+.16	−.07	−.09	−.08	−.05	−.06	−.08	−.09	−.09	------

ALBUQUERQUE, N. MEX.

Sept. 1	6.3	0.61	0.71	0.82	0.98	------	------	------	------	------	6.3
Sept. 2	6.8	.77	.86	.99	1.14	------	------	------	------	------	8.2
Sept. 3	5.8	.71	.84	.91	1.13	1.48	------	------	------	------	8.2
Sept. 4	8.8	------	------	------	------	------	1.22	------	------	------	10.2
Sept. 5	9.1	------	------	------	1.11	1.46	1.14	------	------	------	7.9
Sept. 6	7.9	------	------	------	1.18	1.46	1.28	1.16	1.11	1.04	6.8
Sept. 7	6.8	------	------	------	1.22	1.47	1.20	1.13	1.06	1.02	7.6
Sept. 8	5.4	------	------	------	1.22	1.44	1.30	1.20	1.14	1.07	7.6
Sept. 9	7.0	------	------	------	------	------	1.18	1.10	1.01	.92	7.9
Sept. 11	6.5	.73	.84	.98	1.16	1.41	1.28	1.18	1.14	1.08	7.9
Sept. 12	6.3	------	------	------	1.18	1.40	1.25	1.14	------	.95	8.8
Sept. 13	7.0	------	------	------	1.07	1.45	1.28	1.16	1.10	.99	7.3
Sept. 14	6.0	------	------	------	1.13	1.46	1.27	------	------	------	6.8
Sept. 17	9.8	.80	.92	1.01	1.15	1.52	------	1.16	1.13	1.07	11.0
Sept. 18	7.9	.77	.88	1.03	1.16	1.46	1.27	1.17	1.13	1.09	9.5
Sept. 19	6.5	.96	.99	1.12	1.25	1.56	1.34	1.26	1.24	1.18	8.8
Sept. 20	5.6	1.00	1.08	1.16	1.32	1.65	1.39	1.32	1.24	1.20	6.8
Sept. 21	4.8	.90	.97	1.10	1.25	------	------	------	------	------	6.8
Sept. 22	7.3	.65	.89	1.04	1.16	1.58	------	------	------	------	9.8
Means	------	.79	.90	1.02	1.16	1.49	1.27	1.18	1.13	1.06	------
Departures	------	−.05	−.06	−.06	−.06	+.01	.00	+.07	+.12	+.13	------

BLUE HILL, MASS.

Sept. 2	25.0	------	------	------	------	------	------	------	0.58	------	21.1
Sept. 4	13.2	------	0.72	0.93	1.10	------	------	------	------	------	15.9
Sept. 7	21.1	------	------	------	------	------	------	(.90)	------	0.77	16.4
Sept. 8	8.4	0.84	------	------	------	------	------	------	------	------	11.4
Sept. 10	12.7	------	.77	.92	1.14	------	1.07	.86	.74	.66	11.4
Sept. 11	13.2	.73	.85	.98	1.15	------	.87	.67	.54	.44	12.3
Sept. 15	21.1	------	------	------	------	------	------	------	.62	.48	19.0
Sept. 16	17.0	.50	.57	.66	.83	------	------	------	------	------	17.0
Sept. 17	18.3	.64	.71	.89	------	1.31	------	------	------	------	17.0
Sept. 22	11.8	.93	1.02	1.12	1.26	------	1.23	------	.92	------	10.2
Sept. 23	9.1	------	.98	------	1.29	1.51	1.31	------	------	.92	6.6
Sept. 24	5.8	------	------	------	------	1.54	1.31	1.21	1.10	1.01	6.9
Sept. 25	6.1	.97	1.07	1.18	------	------	------	1.02	.94	.84	7.8
Sept. 29	11.0	------	------	------	1.32	1.52	1.31	1.14	1.06	.96	9.4
Sept. 30	8.7	.91	1.01	1.08	1.31	1.54	------	------	------	------	8.4
Means	------	.79	.88	.97	1.18	1.43	1.18	.97	.81	.76	------
Departures	------	.00	−.03	−.03	+.04	+.11	+.05	+.03	+.01	+.09	------

*Extrapolated.

TABLE 1.—*Solar radiation intensities during September 1944*—Con.

BOSTON, MASS.

Date	Sun's zenith distance: 7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass: A. M.				*1.0	P. M.				Local mean solar time
	e	5.0	4.0	3.0	2.0		2.0	3.0	4.0	5.0	e
	mb.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mb.
Sept. 4	14.2	------	------	0.87	1.05	1.27	------	------	------	------	14.8
Sept. 8	9.1	------	------	1.06	------	------	------	------	------	------	11.4
Sept. 11	12.3	------	------	------	------	1.12	------	------	------	------	13.7
Sept. 15	19.0	------	------	1.01	1.18	1.36	------	------	------	------	22.6
Sept. 16	18.3	------	------	.61	.68	------	------	------	------	------	17.7
Sept. 22	12.3	------	------	1.01	1.27	------	------	------	------	------	10.2
Sept. 25	8.4	------	------	------	------	1.12	------	------	------	------	9.8
Sept. 27	12.3	------	------	.62	.79	------	------	------	------	------	15.3
Sept. 29	11.0	------	------	1.12	1.25	1.56	------	------	------	------	11.4
Sept. 30	8.4	------	------	.98	1.27	1.55	------	------	------	------	12.3
Means	------	------	------	.91	1.07	1.33	------	------	------	------	------
Ratio, Boston-Blue Hill on comparable dates											
	------	------	------	.92	.95	------	------	------	------	------	------

TABLE 1.—*Solar radiation intensities during September 1944*—Con.

LATE DATA

BOSTON, MASS.

Date	Sun's zenith distance: 7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass: A. M.				*1.0	P. M.				Local mean solar time
	e	5.0	4.0	3.0	2.0		2.0	3.0	4.0	5.0	e
	mb.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mb.
Aug. 1	19.0	------	------	0.66	0.87	------	------	------	------	------	18.3
Aug. 4	22.6	------	0.53	.66	.87	------	------	------	------	------	24.2
Aug. 5	24.2	------	------	------	.50	------	------	------	------	------	23.4
Aug. 8	14.8	------	------	------	1.16	1.40	------	------	------	------	16.4
Aug. 9	14.2	------	.74	.92	1.08	1.41	------	------	------	------	14.2
Aug. 11	19.0	------	.44	.56	.76	.98	------	------	------	------	19.0
Aug. 14	27.7	------	------	------	.48	------	------	------	------	------	23.4
Aug. 15	25.0	------	------	------	.64	------	------	------	------	------	21.1
Aug. 17	25.0	------	------	------	.65	------	------	------	------	------	25.0
Aug. 19	11.0	------	------	------	1.03	1.40	------	------	------	------	11.4
Aug. 23	12.7	------	------	.97	------	------	------	------	------	------	9.1
Aug. 25	11.4	------	------	------	1.00	1.23	------	------	------	------	10.6
Aug. 26	10.2	------	------	.88	1.10	1.44	------	------	------	------	14.2
Aug. 28	12.3	------	------	.94	.96	------	------	------	------	------	13.7
Aug. 30	14.2	------	------	.82	------	------	------	------	------	------	14.8
Aug. 31	15.3	------	------	.97	1.09	1.33	------	------	------	------	14.8
Means	------	------	(.57)	.82	.87	1.33	------	------	------	------	------
Ratio, Boston-Blue Hill on comparable dates											
	------	------	.70	.91	.88	------	------	------	------	------	------

TABLE 2.—*Daily totals and weekly means of solar radiation (direct + diffuse) received on a horizontal surface*

[Gram-calories per square centimeter]

Date	Washington, D. C.	Madison, Wis.	Lincoln, Nebr.	East Lansing, Mich.	New York, N. Y.	Fresno, Calif.	Fairbanks, Alaska	Columbia, Mo.	Boston, Mass.	Nashville, Tenn.	Twin Falls, Idaho	La Jolla, Calif.	Riverside, Calif.	Blue Hill, Mass.	Ithaca, N. Y.	Newport, R. I.	State College, Pa.	Put-in-Bay, Ohio	East Wareham, Mass.	Davis, Calif.	Boulder, Colo.	Tooele, Utah	Illumination—Boston, Mass.
1944	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	*Avg. ft. candles*
Sept. 3	456	484	547	417	480	579	196	------	429	485	526	556	514	477	525	430	396	514	441	584	567	676	3,872
Sept. 4	403	531	465	402	241	570	264	------	381	478	532	304	559	422	228	371	255	453	440	573	559	654	3,574
Sept. 5	501	453	270	299	374	566	162	443	108	441	526	240	561	182	205	246	271	337	365	572	525	652	1,345
Sept. 6	487	410	575	157	434	551	160	597	77	186	524	322	539	137	423	296	407	252	106	567	567	652	1,066
Sept. 7	497	546	441	394	533	537	136	590	345	462	514	499	516	372	428	475	466	513	484	554	539	634	3,190
Sept. 8	446	515	530	433	389	537	175	544	451	562	489	487	537	451	105	469	240	564	514	554	453	636	4,087
Sept. 9	475	340	333	466	177	536	317	495	247	544	490	328	541	293	224	426	250	545	453	551	410	640	2,626
Mean	466	468	452	367	376	554	201	534	291	451	516	391	538	333	305	387	326	454	409	565	517	649	2,823
Departure	+75	+92	+11	+33	+12	−7	−10	------	------	+85	+7	−101	+51	−35	−74	−33	−49	+52	+27	−13	------	------	------
Sept. 10	420	398	413	428	511	548	250	486	486	476	500	301	464	485	519	416	487	514	552	488	442	641	4,308
Sept. 11	259	207	424	354	474	507	(140)	140	423	107	495	385	456	452	496	504	518	332	524	487	558	635	3,852
Sept. 12	80	69	256	59	72	513	145	365	179	168	451	176	458	196	123	261	45	101	304	518	549	615	2,021
Sept. 13	135	149	349	228	56	566	70	242	59	467	472	115	356	111	112	94	88	466	130	506	469	588	790
Sept. 14	89	117	500	217	68	543	230	415	186	408	504	135	418	142	131	243	117	310	279	529	328	592	1,960
Sept. 15	434	414	490	238	328	532	302	521	468	446	493	186	440	287	253	------	350	408	------	558	370	653	4,319
Sept. 16	463	225	441	392	342	534	232	353	416	484	331	208	508	427	348	405	364	459	------	423	538	595	3,885
Mean	268	226	411	274	265	535	205	360	317	365	464	215	443	300	283	321	281	370	358	501	466	617	3,022
Departure	−110	−116	−7	−30	−94	+6	−1	------	------	+16	−10	−241	−14	−71	−65	−68	−97	−16	−6	−43	------	------	------
Sept. 17	366	436	396	247	340	550	86	412	436	435	195	72	451	451	472	477	337	441	------	558	519	454	3,943
Sept. 18	102	446	105	346	163	549	68	454	97	414	489	433	514	115	405	251	74	403	------	541	490	329	1,029
Sept. 19	126	124	378	346	41	525	63	422	186	359	484	522	575	230	156	182	111	404	------	513	493	581	1,875
Sept. 20	243	412	419	218	124	321	202	456	104	381	478	------	522	124	383	158	190	315	------	503	526	598	1,200
Sept. 21	274	509	510	365	82	531	212	492	185	386	413	528	527	169	298	153	324	467	------	518	463	562	1,870
Sept. 22	366	349	280	272	369	518	105	488	402	525	457	520	570	443	372	403	295	397	------	524	479	552	3,463
Sept. 23	376	100	138	310	482	504	6	150	460	426	448	431	544	488	462	448	435	341	------	450	460	539	3,618
Mean	264	339	318	301	229	500	106	410	267	418	423	418	529	288	364	260	252	381	------	517	490	516	2,428
Departure	−106	−13	−88	−12	−105	+11	−57	------	------	+79	−13	0	+53	−71	−12	−99	−123	+14	------	+1	------	------	------
Sept. 24	408	244	479	402	492	506	32	403	428	447	445	350	514	440	496	377	493	376	453	496	412	531	3,431
Sept. 25	175	453	393	340	364	484	76	413	417	459	440	243	494	444	358	460	400	453	503	511	296	527	3,320
Sept. 26	426	373	332	314	344	490	65	403	332	228	436	164	493	378	285	375	407	417	391	511	417	520	2,825
Sept. 27	310	362	191	306	296	478	206	99	351	278	426	433	457	349	80	316	385	353	357	467	423	512	2,912
Sept. 28	197	205	439	61	156	460	17	28	90	192	410	415	397	112	345	269	94	61	305	438	399	500	1,007
Sept. 29	74	278	464	358	476	463	33	131	417	65	294	394	299	443	213	407	497	430	441	306	277	188	3,395
Sept. 30	41	364	77	351	113	475	111	257	418	86	136	283	222	456	471	372	141	392	478	474	302	52	3,382
Mean	232	326	340	304	320	479	77	248	350	251	370	326	411	375	321	368	346	340	418	470	361	404	2,896
Departure	−116	+27	−21	−12	+6	+28	−55	------	------	−77	−64	−49	−33	+26	−7	+15	+12	−13	+70	−15	------	------	------

ACCUMULATED DEPARTURES ON SEPT. 30, 1944

	−3,798	−1,596	−8,817	------	−4,941	+4,699	------	------	------	+3,367	------	−6,680	------	+1,068	------	−4,397	−1,364	+1,362	+2,609	−1,411	------	------	------

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR SEPTEMBER 1944

By LUCY T. DAY

[Equatorial Division, U. S. Naval Observatory]

[Communicated by Commodore J. F. Hellweg, U. S. N. (Ret.) Superintendent, U. S. Naval Observatory.] All measurements and spot counts were made at the Naval Observatory from plates taken at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day, under longitude, latitude, area of spot or group, and spot count are included assumed longitude of center of the disk, assumed latitude of center of the disk, total areas of spots and groups and total spot count.

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1944	h m		°	°	°	°				
Sept. 1	10 54	7666	+57	42	−30	66	24	2	G	U. S. Naval.
		7666	+59	44	−30	67	73	2		
		7663	+61	46	−23	67	6	1		
		7663	+65	50	−24	70	6	1		
				(345)	(+7)		109	6		
2	10 12	7666	+68	41	−32	74	121	1	F	Do.
		7666	+69	42	−31	75	24	1		
		7666	+72	45	−30	78	194	1		
		7663	+79	52	−24	80	6	1		
				(333)	(+7)		345	4		
3	11 7	7666	+85	44	−32	85	24	2	G	Do.
				(319)	(+7)		24	2		
4	10 2			No spots.						†Mt. Wilson.
5	10 42			No spots.						Do.
6	10 48	7667	+49	328	−17	53	24	7	G	U. S. Naval.
				(279)	(+7)		24	7		
Sept 7	10 31	(*)	+27	293	+7	37	12	4	G	Do.
		7667	+62	328	−18	67	*12	2		
				(266)	(+7)		24	6		
8	10 30			No spots.						Mt. Wilson.
9	11 16	7668	−78	162	−24	80	194	1	F	U. S. Naval.
				(240)	(+7)		194	1		
10	11 20	7668	−70	156	−25	74	97	2	G	Do.
		7668	−64	162	−25	70	242	1		
				(226)	(+7)		339	3		
11	11 34	7668	−57	156	−24	62	73	4	F	Do.
		7668	−52	161	−25	59	12	1		
		7668	−48	165	−24	57	230	3		
		7668	−45	168	−25	54	12	1		
				(213)	(+7)		327	9		
12	10 23	7668	−45	155	−26	55	73	10	VG	Mt. Wilson.
		7668	−40	160	−26	51	12	1		
		7668	−36	164	−25	46	97	22		
		7668	−36	164	−24	46	194	1		
		7668	−33	167	−26	45	48	15		
				(200)	(+7)		424	55		
13	12 20	7668	−30	156	−25	43	36	2	F	U. S. Naval.
		7668	−30	156	−27	45	24	1		
		7668	−25	161	−26	40	36	1		
		7668	−22	164	−25	38	242	1		
		7668	−22	164	−23	37	97	6		
		7668	−17	169	−25	36	121	2		
				(186)	(+7)		556	13		
14	15 44	7668	−15	156	−25	35	16	1	F	Do.
		7668	−11	160	−26	36	12	1		
		7668	−8	163	−25	34	242	1		
		7668	−8	163	−23	32	97	7		
		7668	−8	163	−22	31	6	1		
		7668	−4	167	−25	33	85	3		
				(171)	(+7)		458	14		
15	10 29	7668	−5	156	−25	33	16	4	G	Do.
		7668	−2	159	−26	33	12	3		
		7668	+1	162	−25	32	206	1		
		7668	+2	163	−24	31	48	6		
		7668	+6	167	−25	33	73	3		
				(161)	(+7)		355	19		
16	10 35	7668	+9	167	−25	33	6	1	G	Do.
		7668	+15	163	−25	35	206	1		
		7668	+20	168	−26	38	73	3		
				(148)	(+7)		285	5		

POSITIONS, AREAS, AND COUNTS OF SUNSPOTS FOR SEPTEMBER 1944—Continued

By LUCY T. DAY

[Equatorial Division, U. S. Naval Observatory]

[Communicated by Commodore J. F. Hellweg, U. S. N. (Ret.) Superintendent, U. S. Naval Observatory.] All measurements and spot counts were made at the Naval Observatory from plates taken at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day, under longitude, latitude, area of spot or group, and spot count are included assumed longitud of center of the disk, assumed latitude of center of the disk, total areas of spots and groups and total spot count.

Date	Eastern standard time	Mount Wilson group No.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Area of spot or group	Spot count	Plate quality	Observatory
1944	h m		°	°	°	°				
Sept. 17	10 33	7668	+21	155	−25	38	6	1	G	U. S. Naval.
		7668	+25	159	−25	40	12	3		
		7668	+27	161	−25	42	206	1		
		7668	+32	166	−25	45	11	2		
				(134)	(+7)		285	7		
18	10 20	7668	+41	162	−25	51	206	1	G	Mt. Wilson.
		7668	+47	168	−25	56	61	1		
				(121)	(+7)		267	2		
9	10 10	7669	−66	42	−25	71	24	4	G	Do.
		7668	+55	163	−25	61	206	1		
		7668	+59	167	−24	65	121	7		
				(108)	(+7)		351	12		
20	11 38	7669	−51	43	−26	60	12	2	F	U. S. Naval.
		7669	−47	47	−24	56	16	2		
		7668	+69	163	−25	73	206	1		
		7668	+72	166	−24	77	61	1		
		7668	+72	166	−25	77	97	1		
				(94)	(+7)		392	7		
21	10 41	7669	−37	44	−25	48	36	9	VG	Do.
		7669	−32	49	−24	45	73	5		
		7668	+80	167	−25	56	206	1		
				(81)	(+7)		315	15		
22	10 24	7669	−23	45	−25	38	36	9	G	Do.
		7669	−19	49	−24	37	48	10		
		7669	−17	51	−24	36	145	3		
				(68)	(+7)		229	22		
23	10 44	7669	−11	44	−25	35	61	3	G	Do.
		7669	−7	48	−25	33	85	15		
		7669	−1	54	−24	32	218	1		
				(55)	(+7)		364	19		
24	11 24	7669	+2	43	−25	33	48	3	F	Do.
		7669	+5	46	−24	32	24	2		
		7669	+12	53	−24	34	206	2		
				(41)	(+7)		278	7		
25	14 8	7669	+16	43	−25	35	16	5	F	Do.
		7669	+21	48	−22	36	24	6		
		7669	+25	52	−22	37	61	1		
		7669	+27	54	−24	41	206	1		
				(27)	(+7)		307	13		
26	11 1	7669	+27	42	−25	42	16	6	G	Do.
		7669	+33	48	−24	45	48	12		
		7669	+37	52	−24	48	73	1		
		7669	+38	53	−24	49	242	1		
				(15)	(+7)		379	20		
27	10 39	7669	+45	47	−24	53	24	9	F	Do.
		7669	+50	52	−24	58	61	1		
		7669	+51	53	−24	59	206	1		
				(2)	(+7)		291	11		
28	10 45	7669	+65	54	−24	70	315	3	F	Do.
				(349)	(+7)		315	3		
29	10 35	7671	−1	335	+21	14	36	10	G	Mt. Wilson.
		7670	+14	350	−7	19	24	2		
		7669	+79	55	−24	80	388	1		
				(336)	(+7)		448	13		
30	12 38	•	−39	283	−6	41	12	3	F	Do.
		7671	+12	334	+23	20	97	6		
		7671	+17	339	+21	22	194	1		
				(322)	(+7)		303	10		

Mean daily area for 30 days=266

†Data from Mount Wilson charts.
*Not numbered.

VG=very good; G=good; F=fair; P=poor.

Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, September 1944

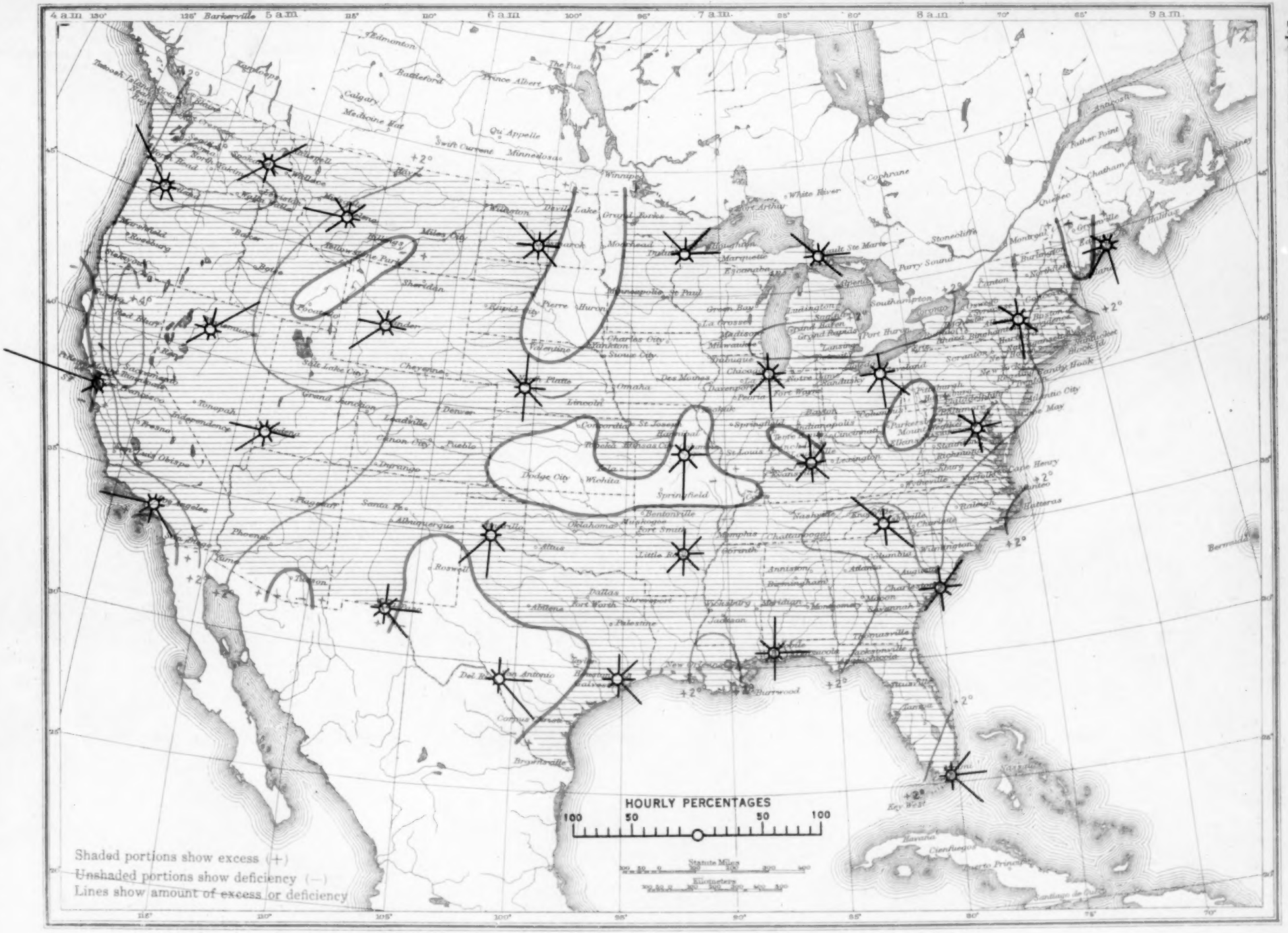
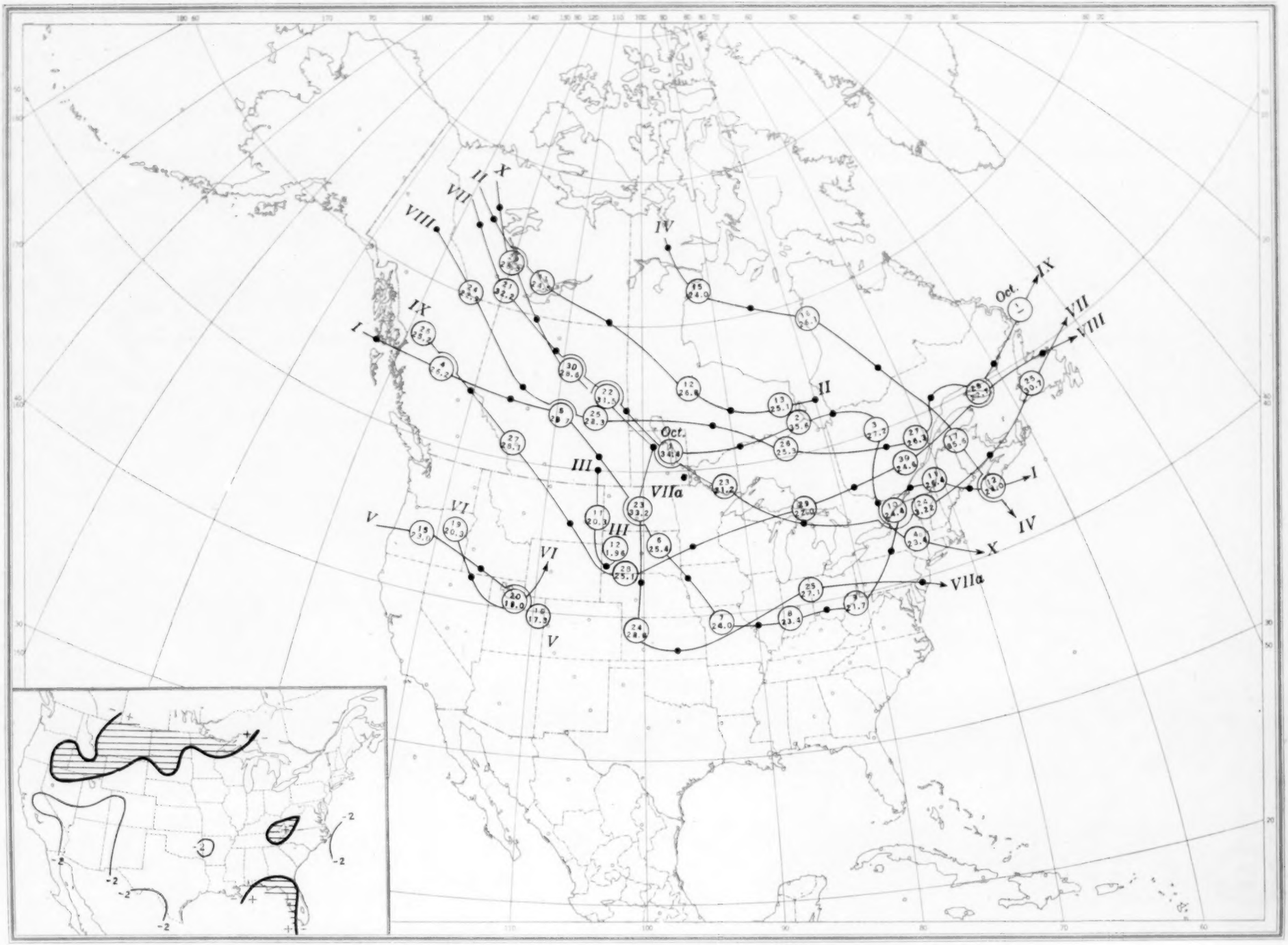


Chart II. Tracks of Centers of Anticyclones, September 1944. (Inset) Departure of Monthly Mean Pressure from Normal

(Plotted by A. Bloom)



Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time)

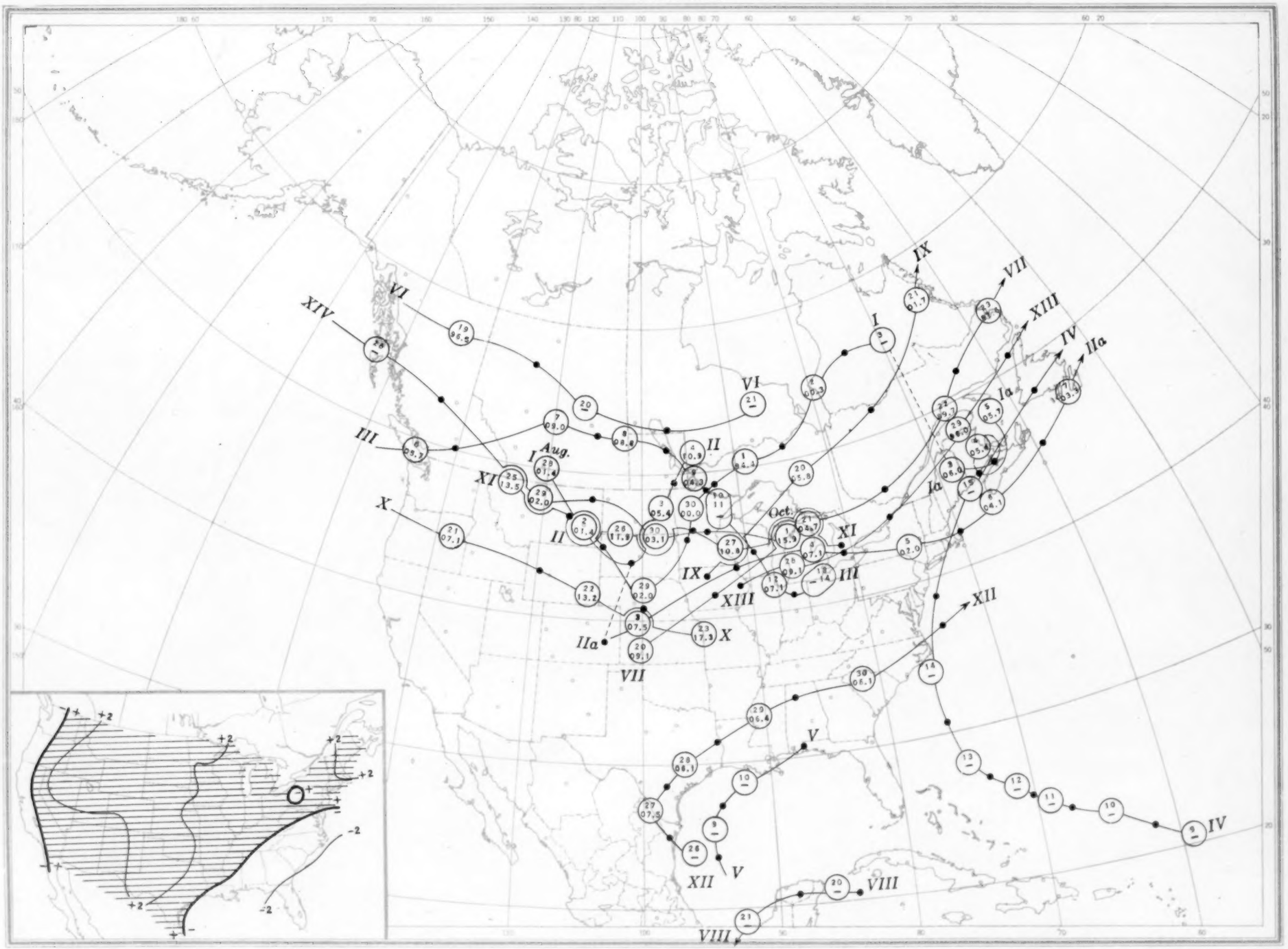
Chart III. Tracks of Centers of Cyclones, September 1944. (Inset) Change in Mean Pressure from Preceding Month

(Plotted by A. Bloom)

Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time)

Chart III. Tracks of Centers of Cyclones, September 1944. (Inset) Change in Mean Pressure from Preceding Month

(Plotted by A. Bloom)



Circle indicates position of cyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of cyclone at 7:30 p. m. (75th meridian time)

Chart IV. Percentage of Clear Sky Between Sunrise and Sunset, September 1944

Chart V. Total Precipitation, Inches, September 1944. (Inset) Departure of Precipitation from Normal

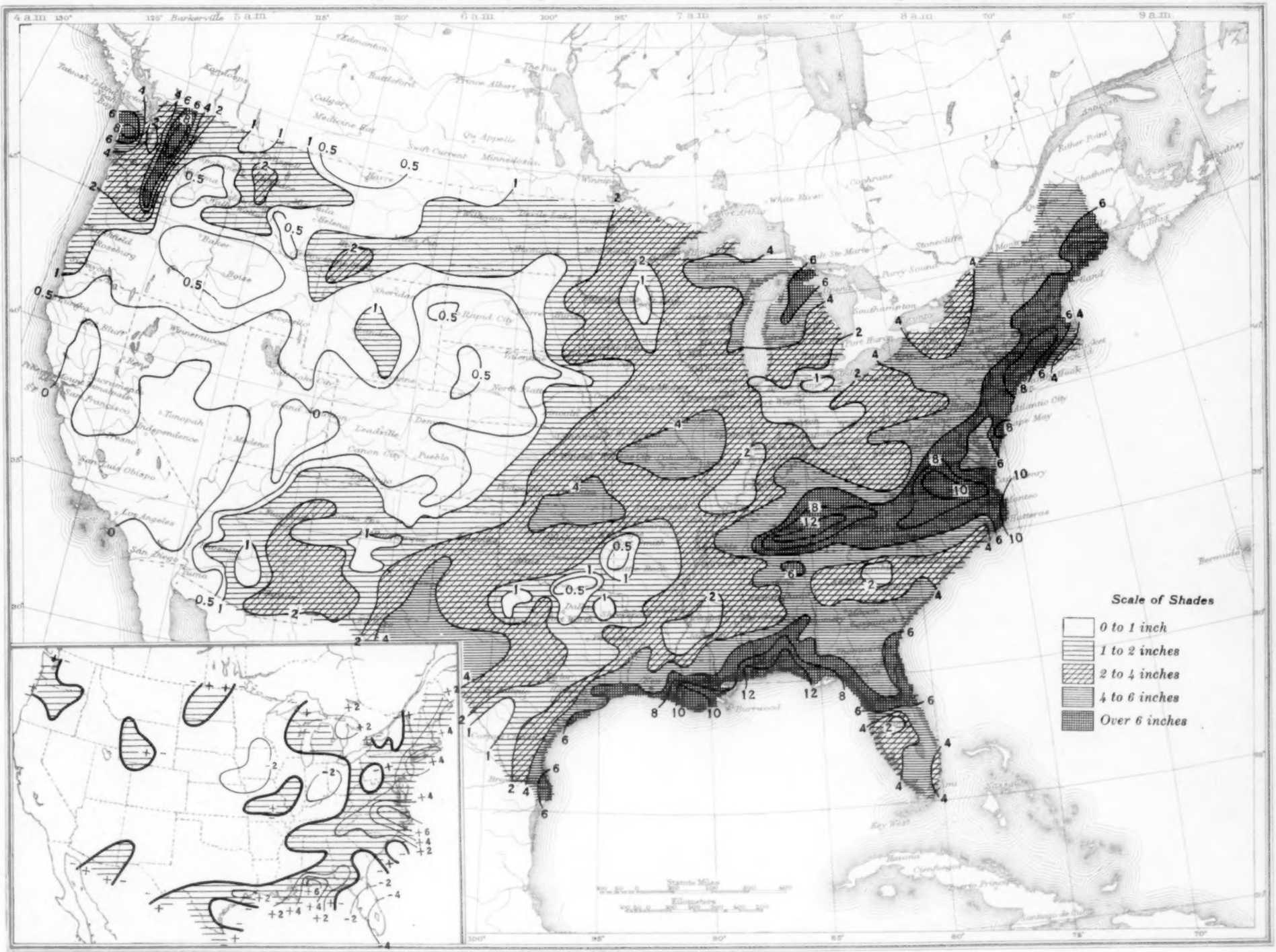


Chart VI. Isobars at Sea Level and Isotherms at Surface; Prevailing Winds, September 1944

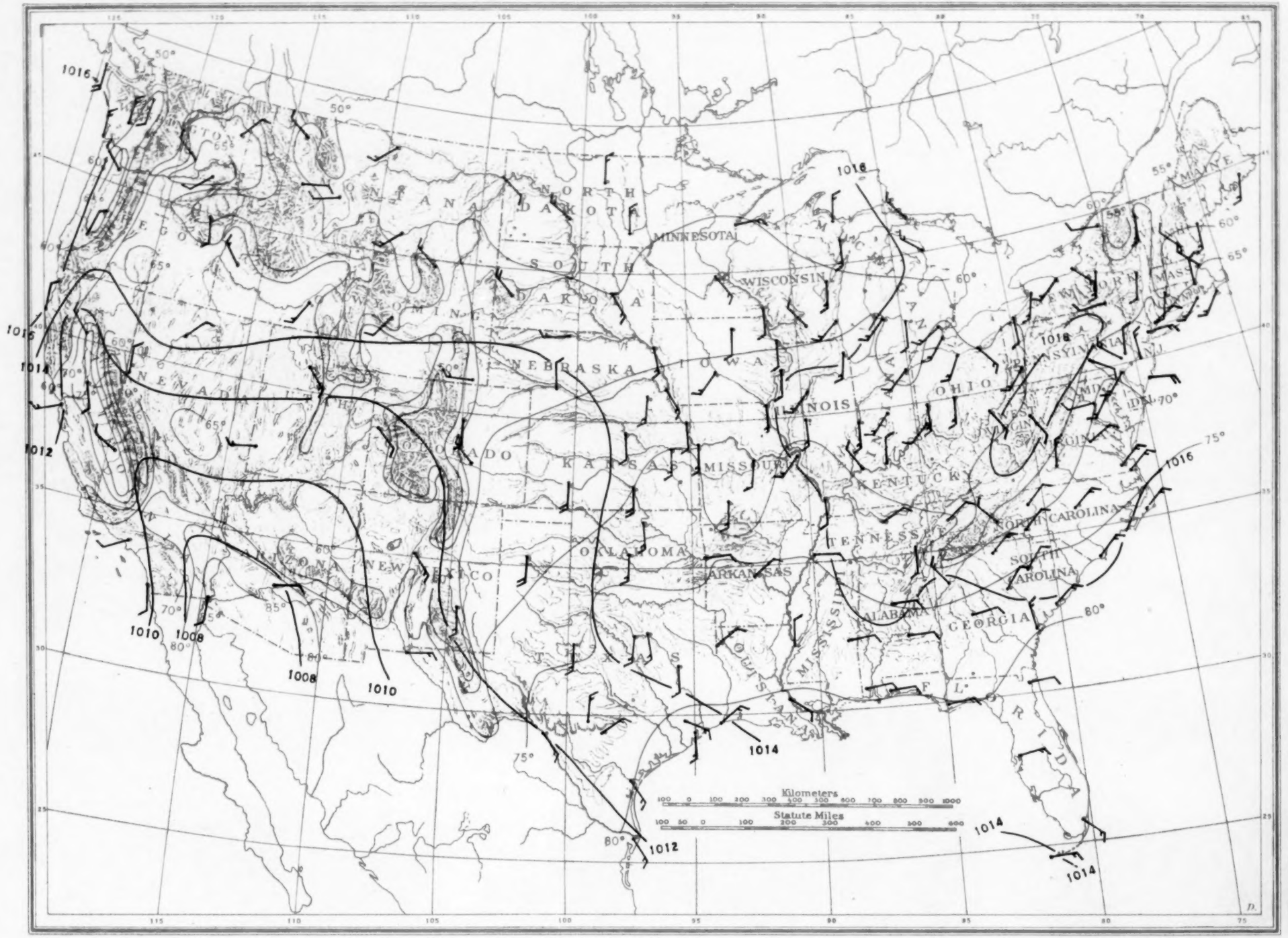


Chart VIII. Isobars (mb) for 1,524 Meters (5,000 ft.), and Isotherms (°C.), and Resultant Winds for 1,500 Meters (m. s. l.) September 1944

Chart VIII. Isobars (mb) for 1,524 Meters (5,000 ft.), and Isotherms (°C.), and Resultant Winds for 1,500 Meters (m. s. l.) September 1944

Isobars and Isotherms based on radiosonde observations at 11:00 p. m. (E. S. T.) and winds based on pilot-balloon observations at 5:00 a. m. (E. S. T.).

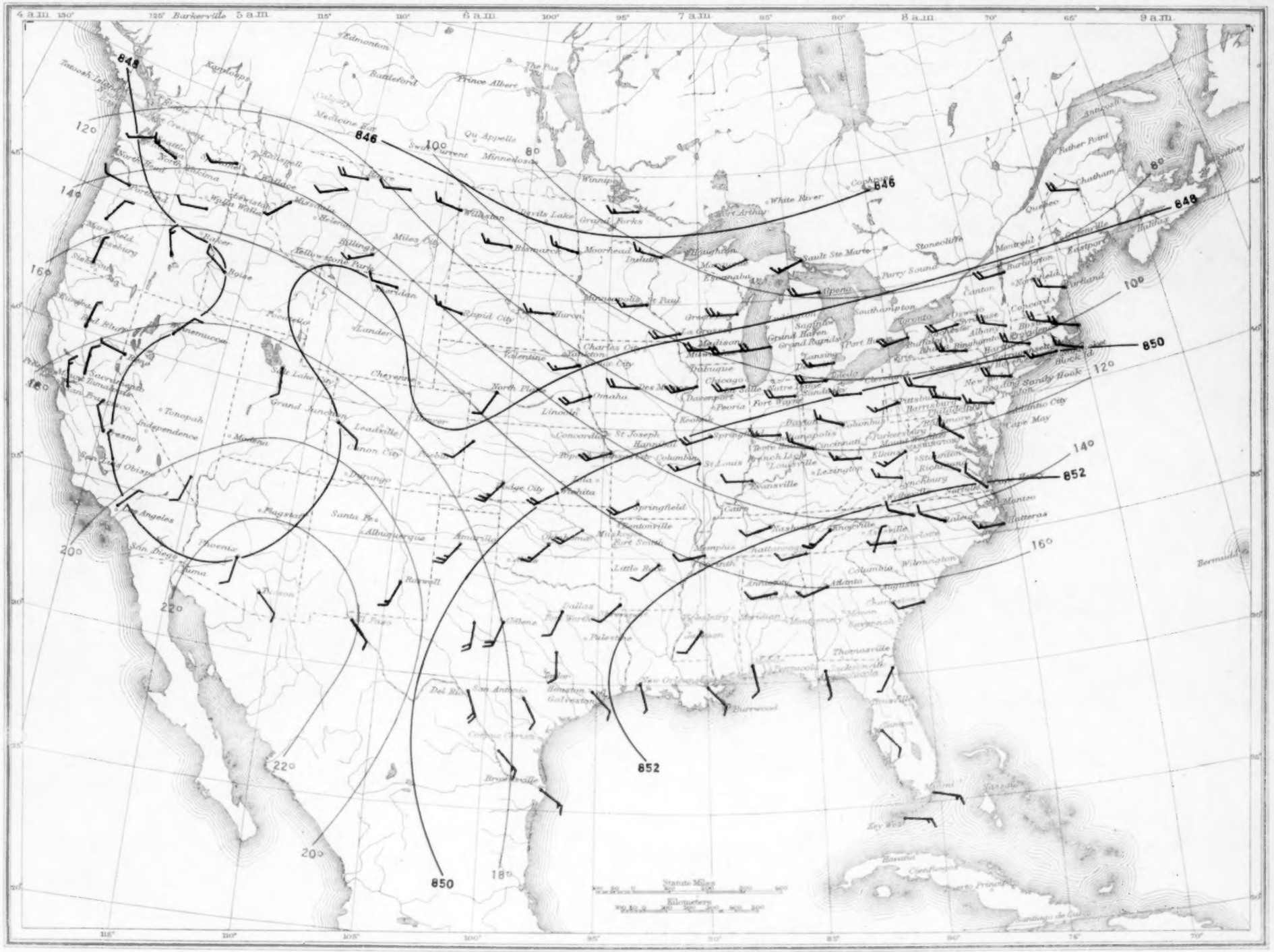

4 a.m.
5 a.m.
6 a.m.
7 a.m.
8 a.m.
9 a.m.
Barkerville
Edmonton
Battleford
Prince Albert
The Pas
Kamloops
Calgary
Medicine Hat
Qu'Appelle
Swift Current
Minnedosa
Winnipeg
Penticton
Wenatchee
Walla Walla
Wallace
Missoula
Helena
Miles City
Billings
Yellowstone Park
Boise
Baker
Pocatello
Rapid City
Huron
Wilkeson
Devils Lake
Grand Forks
Bismarck
Moorhead
Duluth
White River
Sault Ste Marie
Stonecliffe
Parry Sound
Quebec
Chatham
Father Point
Antigonish
Sydney
Halifax
Eastport
Portland
Concord
Boston
Providence
Hartford
Albany
Burlington
Montreal
Ottawa
Toronto
Southampton
Sarnia
Detroit
Grand Haven
Grand Rapids
Fort Wayne
Chicago
Dubuque
Omaha
Lincoln
Des Moines
Peoria
Springfield
St. Joseph
Concordia
Topeka
Wichita
Kansas City
Columbia
St. Louis
Cairo
Evansville
Louisville
Lexington
Cincinnati
Indianapolis
Terre Haute
Parkersburg
Pittsburgh
Harrisburg
Philadelphia
Baltimore
Washington
Norfolk
Cape May
Atlantic City
New York
Sandy Hook
Block Id.
Buffalo
Rochester
Albany
Binghamton
Syracuse
Erie
Lansing
Toledo

Chart IX. Isobars (mb), Isotherms (°C.), and Resultant Winds for 3,000 Meters (m. s. l.) September 1944

Isobars and Isotherms based on radiosonde observations at 11:00 p. m. (E. S. T.) and winds based on pilot-balloon observations at 5:00 a. m. (E. S. T.)

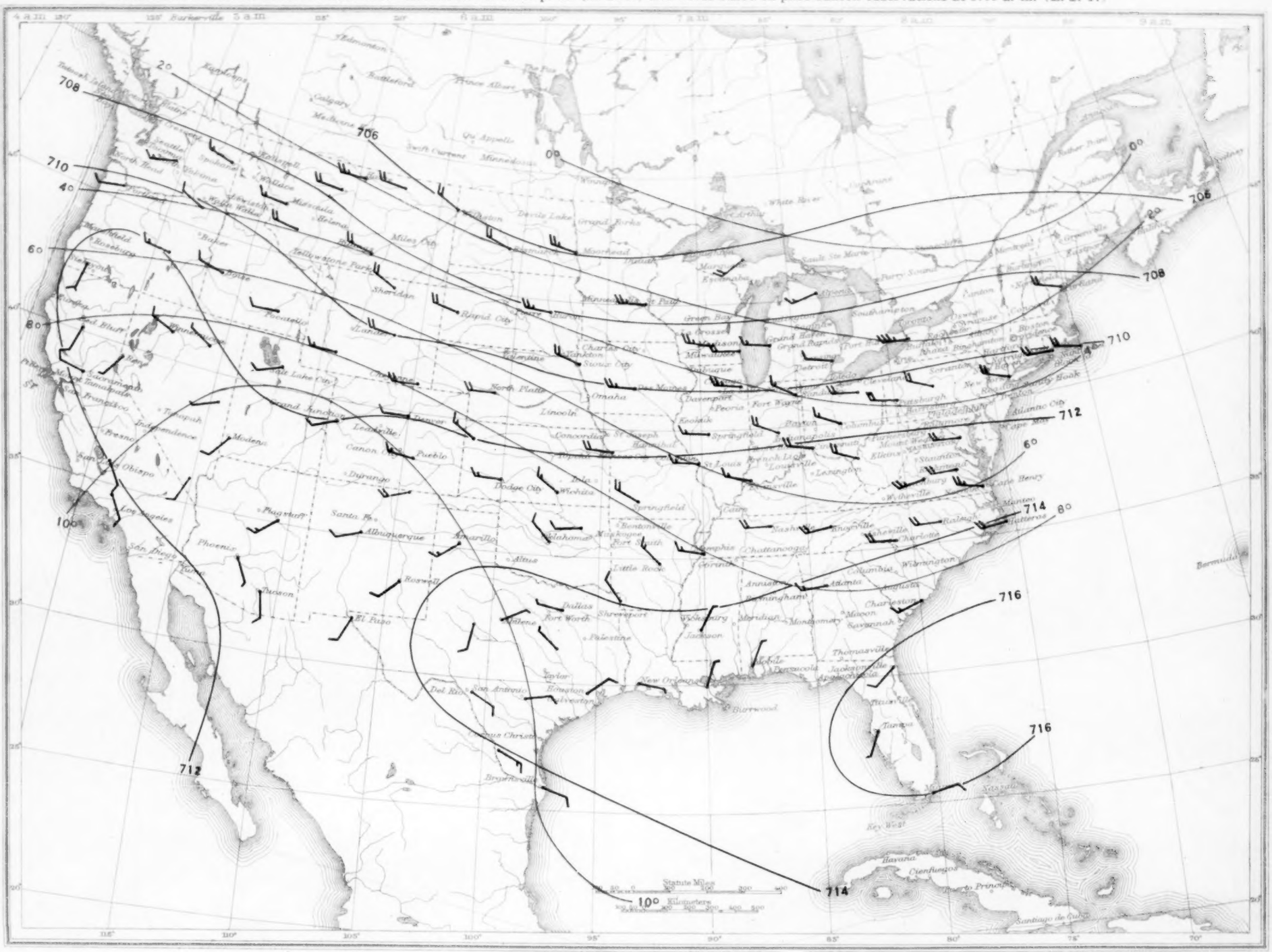


Chart X. Isobars (mb), Isotherms (°C.), and Resultant Winds for 5,000 Meters (m. s. l.) September 1944

Chart X. Isobars (mb), Isotherms (°C.), and Resultant Winds for 5,000 Meters (m. s. l.) September 1944

Isobars and Isotherms based on radiosonde observations at 11:00 p. m. (E. S. T.) and winds based on pilot-balloon observations at 5:00 p. m. (E. S. T.).

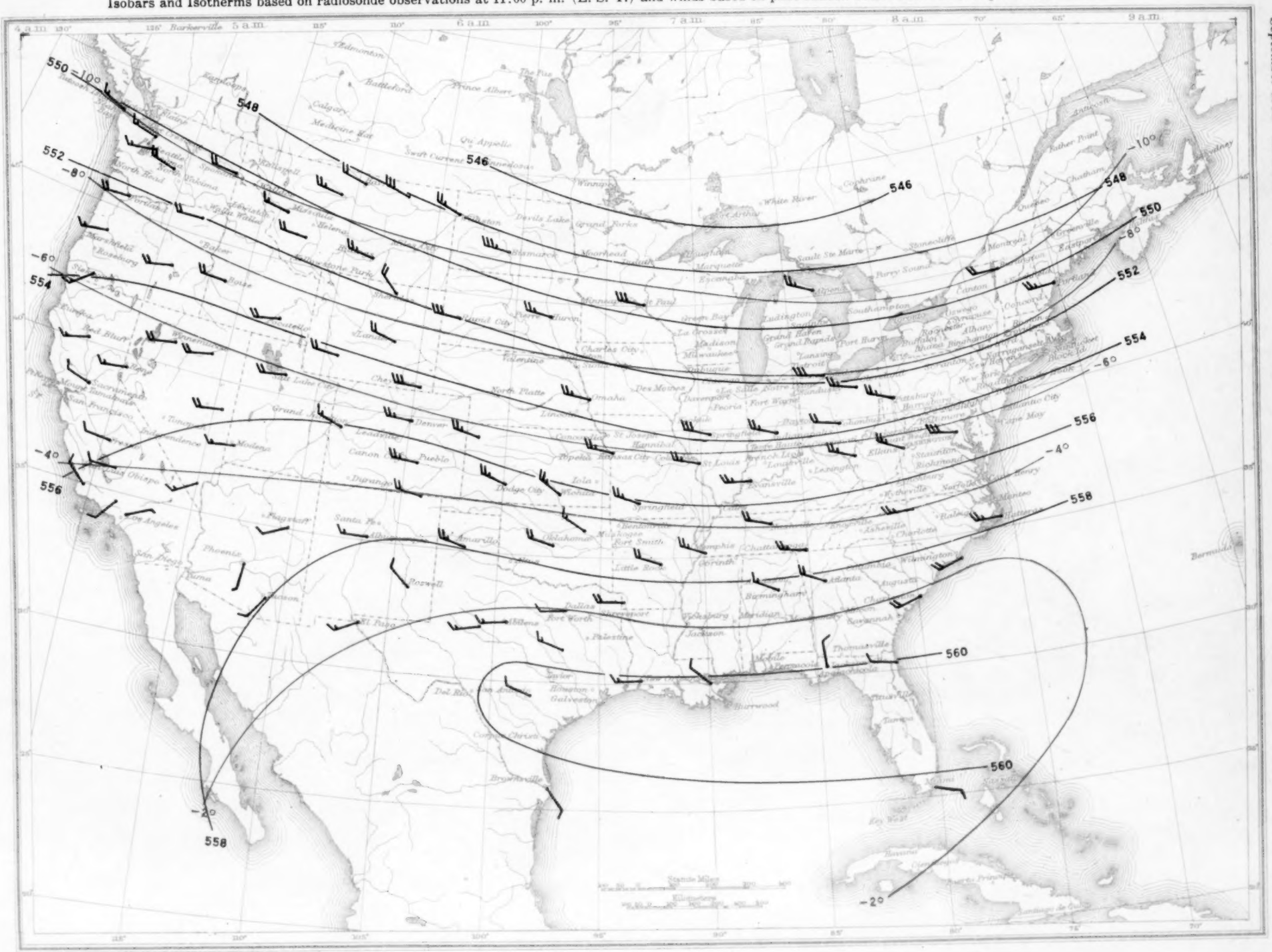
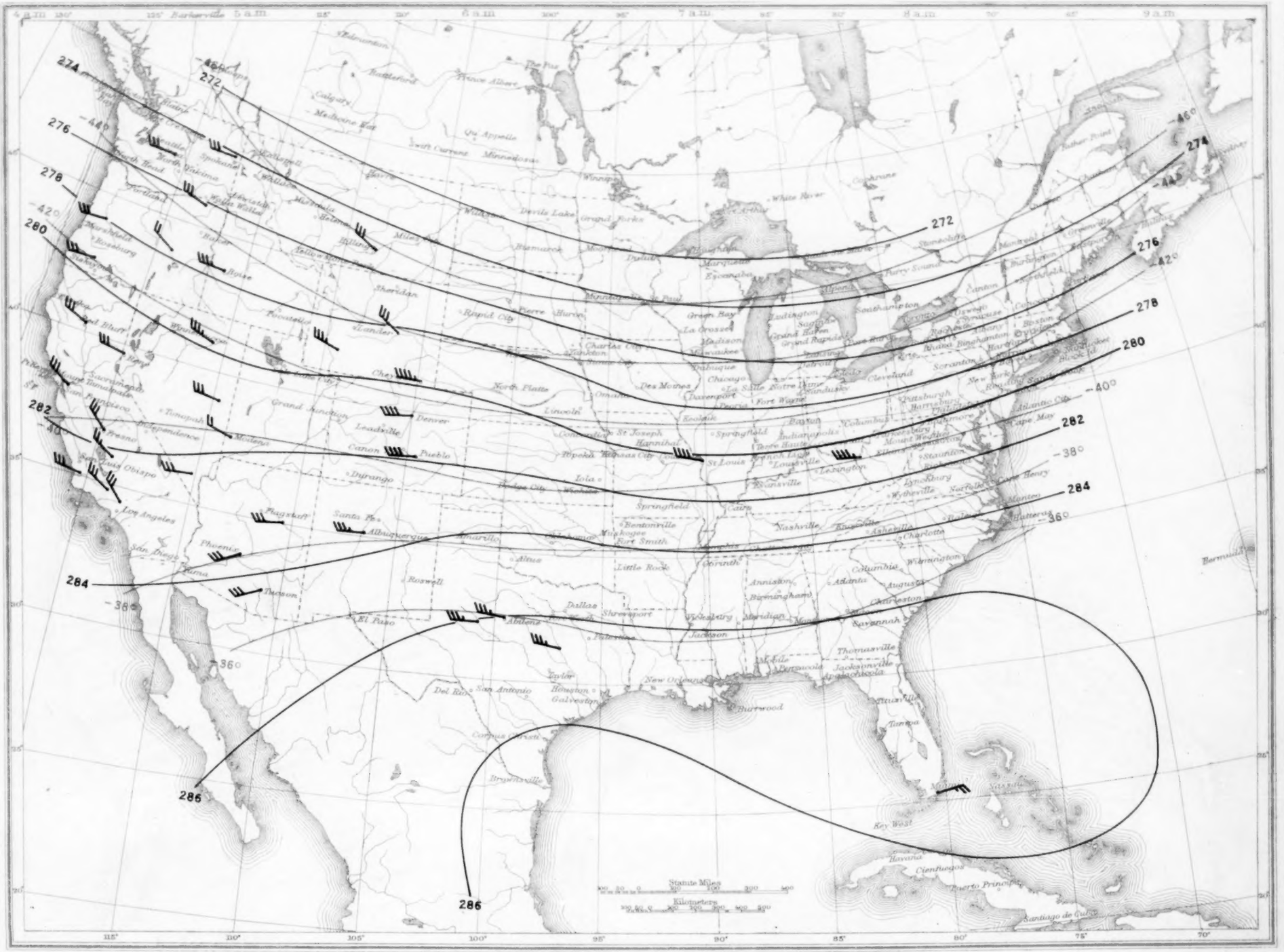


Chart XI. Isobars (mb), Isotherms (°C.), and Resultant Winds for 10,000 Meters (m. s. l.) September 1944

Isobars and Isotherms based on radiosonde observations at 11:00 p. m. (E. S. T.) and winds based on pilot-balloon observations at 5:00 p. m. (E. S. T.).